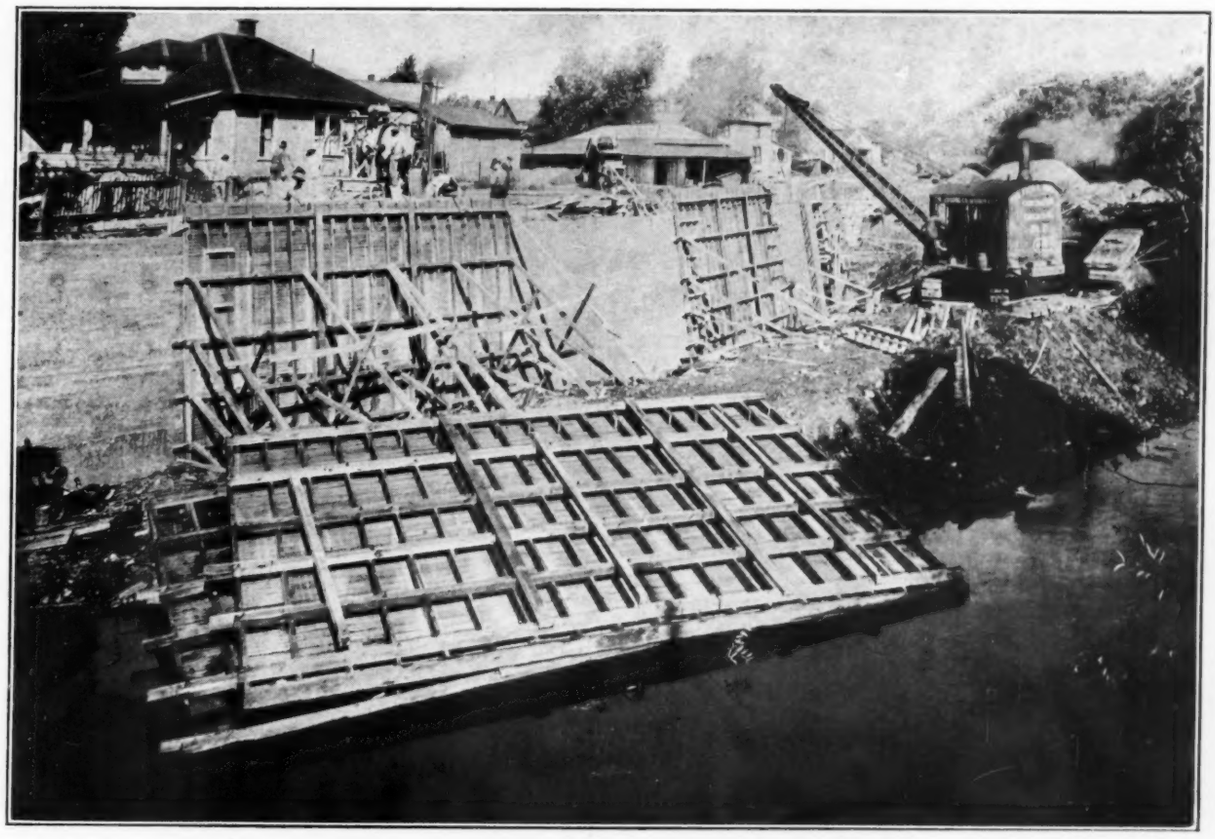
PUBLIC WORKS

CITY COUNTY STATE

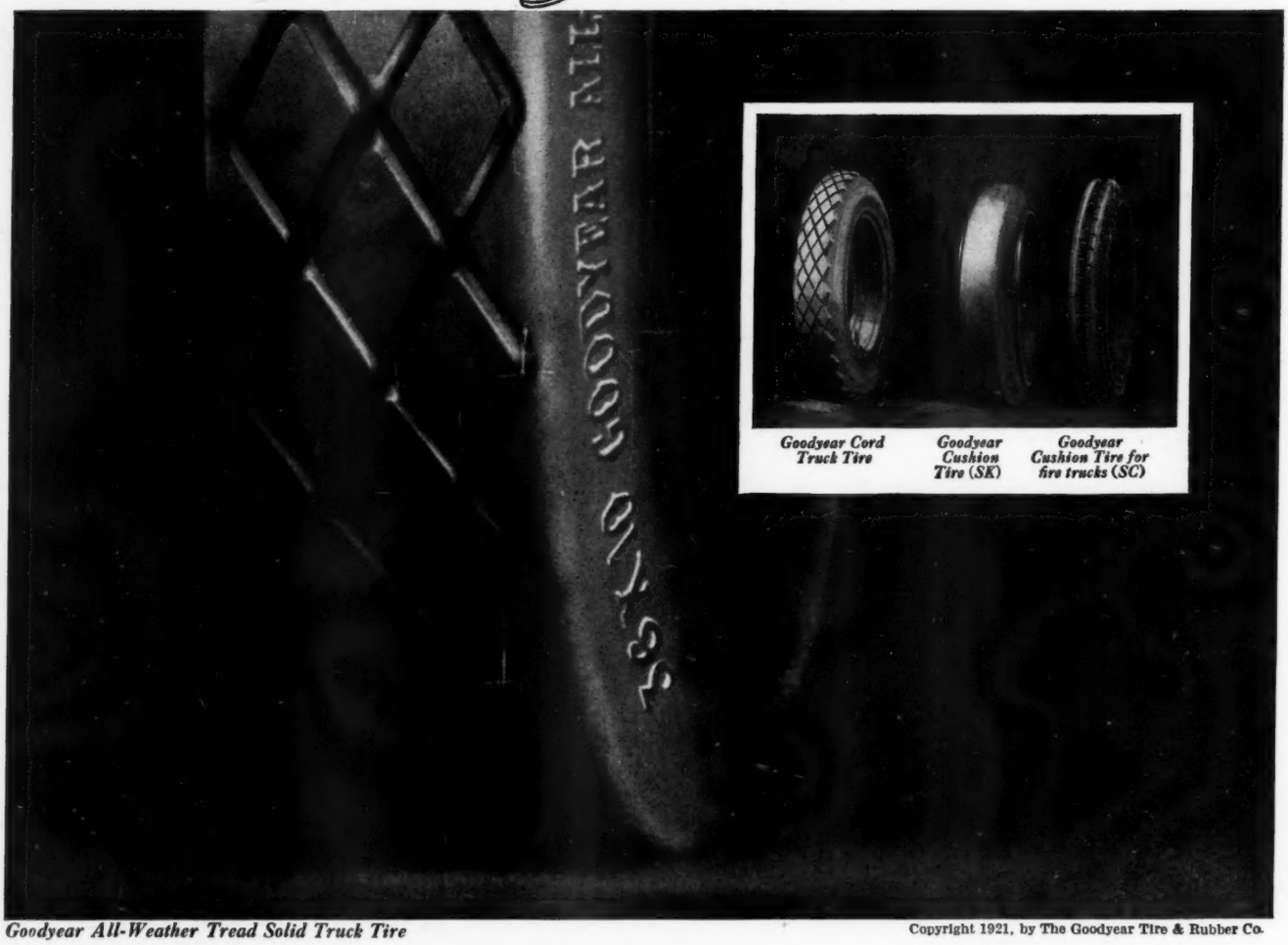


CONSTRUCTING WALL ALONG NIMISKILLEN CREEK.
Heavy forms handled by machine that was used as both locomotive crane and drag-line excavator.

IN THIS ISSUE

DECEMBER 24, 1921

GOODYEAR



Goodyear Cord Truck Tire — *Goodyear Cushion Tire (SK)* — *Goodyear Cushion Tire for fire trucks (SC)*

Goodyear All-Weather Tread Solid Truck Tire

Goodyear All-Weather Tread Solid Tires show remarkable tractive and cushioning qualities in service on heavy duty trucks.

Their All-Weather Tread design furnishes in the 36x10 size, for example, 704 inches of sharp gripping edges so that in the heaviest going this tire grips hard and holds to the road.

The height and tread design of the Goodyear All-Weather Tread Tire make it much more resilient than a smooth surface tire and even springier than many so-called cushions. This lasting resilience protects both the engine and the chassis from road shocks and jars.

Much thicker than the ordinary smooth-tread solid tire, they wear much longer.

Goodyear makes other special tires for lighter and quicker hauling—Goodyear Cord Truck Tires and Goodyear Cushion Tires.

Single Jacket Underwriters Fire Hose

The Underwriters label on Goodyear Single Jacket Fire Hose and Goodyear Monterey Chemical Hose, means that the latter will resist satisfactorily the biting, corrosive action of chemicals and that both will stand a definite pressure per square inch. Goodyear's years of manufacturing experience has enabled the production of hose on a par with all other Goodyear products—hose which will render dependable and economical service.

Monterey Chemical Hose

VOL. 51. No. 26

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PUBLIC WORKS.

CITY COUNTY STATE

A Combination of "MUNICIPAL JOURNAL" and "CONTRACTING"

Vol. 51 DECEMBER 24, 1921 No. 26

Waterworks Tunnel Shafts

Seventeen feet in diameter through clay and solid rock to depth of 165 feet. Sides protected with vertical lagging and lined with concrete. Details of hoisting cage and guides. Pump equipment. Muck trestles and dump.

Western Avenue tunnel extension now under construction by the Waterworks Department of the city of Chicago will extend from the State St. shaft of section 2 of the Southwest land tunnel about 16,000 feet west on W. 73rd St., to the Western Ave. gate shaft, and thence about 17,000 feet north on Western Ave. to 45th St. It is being driven through solid rock from two headings in each of two shafts, one of them located at Wood St., about 4,000 feet east of the Western Ave. gate shaft and the other at 51st, 3,000 feet north of the same shaft.

The Wood St. shaft penetrates through yellow and blue clay, boulders and sand for about 40 feet to the surface of the hard limestone rock, through which it is driven about 118 feet farther to the bottom of the tunnel inverts. The 51st street shaft penetrates about 48 feet through stiff blue and yellow clay and 8 feet through hardpan and about 19 feet through limestone to the invert of the tunnel.

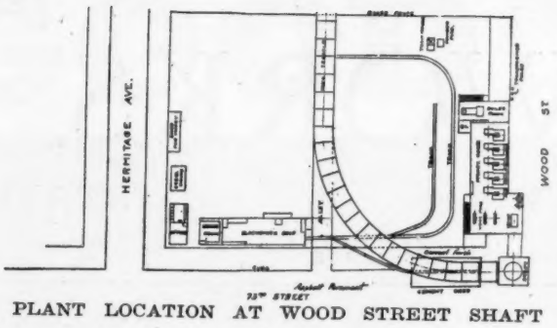
SHAFT SINKING

The shaft excavation, 17 feet in diameter, was made through clay by the Chicago wells process with pick and shovel work. No difficulty was found in keeping the shafts dry, because little or no water entered them except from a broken sewer adjacent to one of the shafts.

As fast as the excavation permitted, the sides were retained by successive sets of 2x6-inch maple lagging 6 feet long, planed on all sides, with their edges radial to the axis of the cylindrical surface and bearing at each end on an interior 4x1-inch sectional horizontal ring with flange bolted connections. At the center of each section of the lagging there was placed a 9-segment full-circle arch of 10-10-inch timbers thoroughly wedged and locked to bearing on the lagging at the joints and at intermediate points.

Excavation was made by a 6-man gang that shoveled up into a Steubner steel bucket, hoisted by a der-

SPOIL BANK AND TRESTLE CARRYING MUCK CARS FORM 51st St. SHAFT



PLANT LOCATION AT WOOD STREET SHAFT

rick. The excavation progressed at the rate of 3 or 4 linear feet per day through the clay and about .75 foot through the rock, which was drilled with an average of about 30 holes.

The six holes in the center of the shaft were arranged in a circle of about 4 feet diameter, and were inclined together downward to make the first cut and throw out a conical mass of rock for the beginning of each lift.

The rock was seamy and irregular and it was sometimes necessary to reload the holes and fire them again or to drill new holes and blast a second time to make the initial opening. Afterward the other holes drilled around the circumference of the shaft and intermediately were usually charged with two or three half-pound dynamite cartridges and fired in perhaps half a dozen successive shots.

The drilling was done with steels 4 and 6 feet long, operated by five jackhammer drills. The rock was broken into small fragments and loaded into ½-yard buckets.

At the Wood St. shaft several small wooden buildings were provided for the installation of construction equipment and for storage. A simple wooden head tower about 40 feet high was built over the shaft to provide for the operation of the elevator cage, which was suspended by a wire cable passed over the top of the tower and down to the hoisting engine in the adjacent building. Adjacent to the tower was a wooden trestle viaduct carrying a narrow-gage track for the muck cars that were pushed by hand down a very light grade to the spoil bank, where they were dumped.

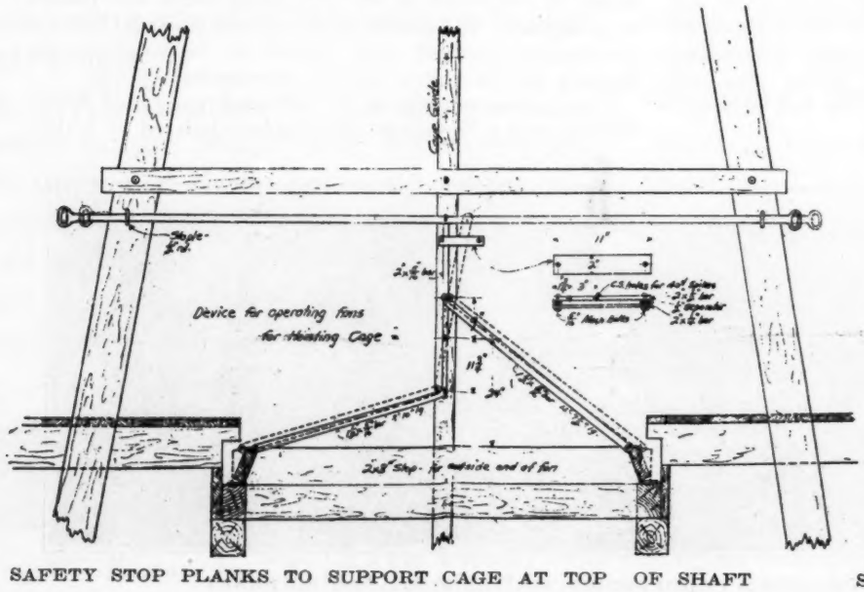
In the rock excavation the shaft was unlined, but above the surface of the rock it was lined with a cicular wall 12 inches thick in sections about 6 feet high, concreted as the excavation progressed.

Each shaft is equipped with two elevator cages, each having a 5 x 7½-foot floor platform with a heavy framework bolted to vertical angle iron side frames about 8½ feet high, provided at each end with riveted sockets receiving the extremities of an 8 x 12-inch wood head block that was also braced to the side frames and carried at the center an eyebolt connection for the operating cable. The side frames on each side were covered by 2-inch horizontal boards to prevent any portion of the cage load from projecting against the sides of the shaft.

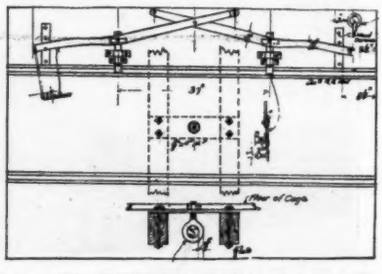
The gate was operated between a pair of 5½ x 7½ inch vertical guides 5 feet 1 inch apart in the clear. The guides were spliced through shiplap joints and were bolted to horizontal frames 7 feet apart that engaged the circular concrete lining and maintained the position and rigidity of the guides. The cross flanges were made of 8 x 10-feet horizontal timber, with the corners fitted to bearing against the surface of the concrete lining and connected by inside 6 x 6-inch angle lugs.

A section of the 24-inch gage service track, corresponding to that on the viaduct, was laid across the floor of the cage to engage the tunnel track at the bottom of the shaft and the spoil track at the top of the tower. After the muck cars were spotted in the cage a pair of stop bars, operated by hand gears, were set to lock the wheels in position to keep the car from rolling to either edge of the cage.

When it was desired to stop the cage at the surface of the ground a pair of stop planks connected by a toggle lever were thrown from a vertical to an inclined plane so that their upper edges were moved towards each other and directly under the floor of the cage, allowing the latter to rest on them and holding it securely in position regardless of the hoisting cable. When it was desired to lower the cage, it was slightly lifted to free it from the stop planks, which were then revolved to the raised position shown in the engraving and cleared the cage, which could then be under the control of the hoisting line. The planks, being securely engaged to the shaft framing, provided a very simple and a solid support for the

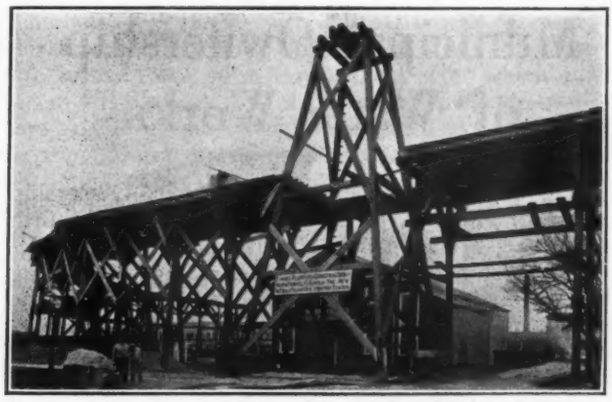


SAFETY STOP PLANKS TO SUPPORT CAGE AT TOP OF SHAFT



STOP FOR TUNNEL CARS ON CAGE

STAVE LINING OF SHAFT 43 FEET DEEP TO SURFACE OF ROCK



HEAD WORKS AND MUCK TRESTLE AT WOOD ST. SHAFT

could be instantly operated from either side of the shaft.

The arrangements of the 51st Street shaft were substantially like those at West Street, except for different positions for the spoil bank, the muck track forming a complete loop, as shown in the illustration on the first page.

The shafts were sunk under the direction of G. F. Samuel and N. P. Steck, resident engineers. J. J. Verslius, engineer of waterworks construction, and Alexander Murdock, city engineer.

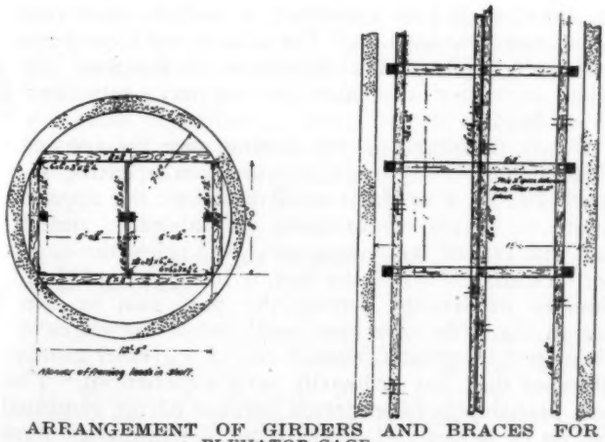
Possibly the Blue Prints

An amusing display of unbelievable credulity that is entitled either to a reward for its absurdity or to resentment as an insult to common intelligence, is the "special dispatch" recently published in the *San Francisco Chronicle* that gravely informs a defenseless world that all the material except the floor for the 240-foot suspension bridge to span the Trinity river, has been shipped from Sacramento to the bridge site by parcel post! We would respectfully suggest that it would make a much better story, and quite as credible, to have exercised a little originality and to have seriously averred that Trinity river and the bridge site were shipped to Sacramento, the bridge washed into place over it, and the combination shipped back again all by parcel post or by telephone—Its a good story if you don't weaken.

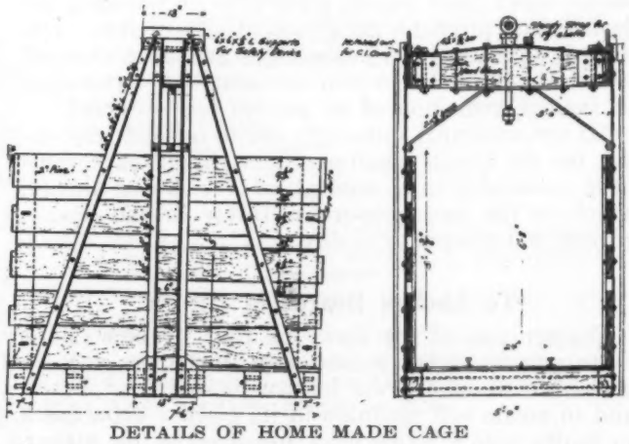
Difficult Sewerage in Ystradgynlais

American sewerage engineers have their own difficulties to contend with, but among them are not included the necessity of operating in towns with names similar to that given above. An English magazine, "Municipal Engineering and the Sanitary Record," describes a system recently built in a town of that name in which there were other difficulties besides that or pronouncing the name. Although the population is under 10,000 and less than 8½ miles of sewer were laid, it was thought necessary to lay lines of sewer under the river in four places, under 6 separate railroad crossings and under a canal in two places.

It may be that the hilly topography of this Welsh town called for this great number of expensive crossings of waterways and railroads, but it hardly seems conceivable that the ingenuity of an American engineer would not have enabled him to eliminate at least half of them. River and canal crossings are generally not only expensive to construct but also difficult to maintain properly and are to be avoided wherever possible.



ARRANGEMENT OF GIRDERS AND BRACES FOR ELEVATOR CAGE.



DETAILS OF HOME MADE CAGE

Municipal Ownership of Water Works

In a paper read before the Public Ownership League of America by R. E. McDonnell of the firm of Burns & McDonnell, the author states that municipal ownership of water works is rapidly becoming almost universal, giving as the chief cause of the change from private to municipal ownership the desire of cities to "improve the service and to secure good, pure, soft water at a reasonable cost. This American cities are doing. There are now about 5,000 municipally owned water plants in the United States, or about five-sixths of all the water supplies are owned by cities. In comparing the people served, it is safe to say that 90 percent of the nation's urban population gets its drinking water from municipal works. The proportion of municipal water plants throughout the country is shown by the statistics of a few of the states. South Dakota has 100 percent of its water plants municipally owned; Nebraska has 99 percent; Kansas has 96.3 percent; Minnesota has 96.4 percent; Oklahoma has 93.1 percent; and Iowa has 91.2 percent."

Among the advantages of municipal ownership Mr. McDonnell refers to the lower interest paid on loans by municipalities, the reduction of incentive to corruption and graft, and the lower rates possible. Concerning the second, he quotes Francis J. Heney as saying: "After five years of investigating the causes and cure for graft, I bring this one message; I am driven to believe that the public ownership of public utilities is the only cure for graft." Municipal ownership as a rule provides better working conditions, shorter hours and better wages, and consequently fewer labor troubles, strikes in municipal plants being practically unheard of.

"We would not think of placing our fire and police departments under private ownership for profit. These are for the protection of property. Then why have our water departments operated under such conditions?"

"Under war conditions, while nearly all privately owned utilities were clamoring for increased rates, 85 percent of the municipal plants maintained their rates and a few actually reduced them. The municipally owned water plant usually gives rates encouraging industries and promotes expansion of all activities. The records of water rates in the cities that have changed ownership show that within two years after changing an average reduction of 27 percent has occurred."

"If the municipal authorities are to be held responsible for the health conditions, they should have complete ownership and control of the water supply, which is the most important factor in the health, growth and prosperity of any city."

To Abolish Boards of Health

Chapter 249 of the Laws of 1921 of New York State permits every second and third-class city by ordinance to abolish its bureau or board of health and to create and maintain in its place a department of health with a single head appointed by the mayor. This law has the approval of the State Department of Health. Amsterdam is the first city to abolish its board of health under this law. Previous to the enactment of this law, Syracuse and Yonkers by special laws abolished their bureaus of health and established departments.

Corrosion of Underground Pipes

Under this head the Journal of the American Institute of Electrical Engineers tells of an investigation being conducted by the Bureau of Standards cooperating with the American Committee on Electrolysis, the manufacturers of iron and steel pipes and representative of public utilities companies. Water works associations and associations of gas works officials have been quite interested in this investigation, the main if not the sole purpose of which is to determine the effect of electrolysis upon underground pipes. The only mention of electrolysis made by the journal referred to, however, is the name of the Committee on Electrolysis, but it refers to the investigation as being stimulated by "a very serious condition in connection with underground pipe systetms owing to the corrosive action of the soil upon the iron of which the pipe is made." The investigation is said to be made "with particular reference to the corrosive action of soils on gas and water mains."

The article remarks that "the results of the tests should be of great value in determining the importance of soil corrosion and in selecting the kind of pipe best suited for use in any particular soil." It is amusing to notice the care with which the writer of the article avoids all reference to electrolysis as being the real source of the destruction of the pipes which is being investigated. One rather wonders, however, what excuse he can have for giving this article a prominent place in a paper devoted to the interests of electrical engineers if the only matter involved is soil corrosion of water and gas pipes.

Sewer Bids in Winona

Winona, Minn., on November 28th, received bids for sewer construction estimated by the city engineer, E. E. Chadwick, to cost $75,489. A large number of contractors were present at the opening of the bids and ten bids were received. It is reported that remarks made by the various contractors indicated that they were all eager to obtain work that could be done in the winter and to employ as many men as possible on it, and each gave assurance of an early start if the work was awarded him. The bids varied from a minimum of $55,625 to a maximum of $92,800. One other contractor was below the engineer's estimate by about $500.

Points of interest in this letting were the considerable number of contractors present at a letting in a small city of a work of moderate size; the apparent desire to obtain winter work for laborers; and the fact that two of the contractors were below the engineer's estimate. As to the last, it has been noted at a number of lettings during the past two or three month that bids have been made below the engineer's estimate by a greater amount and in a greater number of cases than has ordinarily been experienced. This was probably to be expected because of the continual falling of prices and wages after the estimates were

made by the engineers. Indications are, however, that most prices and wages have about reached rock bottom and in fact some have begun to rebound slightly, so that this condition will probably not be so common during the next few months as it has been during the last few.

Teredo Protection for Wooden Piles

The new ocean dock at Port Orford, Ore., has a foundation of fir piles, 55 feet long, that are located in water infested by the Teredo that, under favorable conditions can entirely destroy wooden piles in a year or even less.

The bottom is of clay so hard that it was necessary to blast preliminary holes about 4 feet deep with dynamite before these piles were driven, after which 125 of them were enclosed with cylinders 24 inches in diameter made of galvanized corrugated Armco ingot iron, dipped in a special asphaltic solution and driven with 8-inch strokes of 650-pound hammer. The cylinders were made of No. 14 gage iron and the successive sections were field riveted together instead of receiving the ordinary corrugated iron coupling bands. After the cylinders were put in place the annular spaces between them and the wooden piles were filled with cement concrete, poured under water through an 8-inch pipe.

Planning Sewage Disposal for Small Municipalities

Outline of data that should be considered in preparing plans, nature of conclusion that should be derived, and relations between conditions and types of plant suitable thereto.

In a paper before the A. S. M. I. entitled "Sewage Disposal for Small Municipalities," John F. Skinner, principal assistant city engineer of Rochester, N. Y., presented a very complete synopsis or outline of the data that should be considered, the nature of the conclusions to be derived from such data, the types of plants applicable under certain conditions and the functions performed by each, all arranged in tabulated form. Finally, at the conclusion of the paper, he presented certain observations relative to small sewage treatment plants.

In this outline an effort was made apparently to include every feature likely to be encountered, although it would not be probable that all or even a very considerable percentage might apply to any one case. Mr. Skinner, indeed, states that only one principle could be postulated that will apply to all cases, this being that "each situation is a distinct problem to be studied and solved truthfully; always remembering that the truth upon any subject is obtained by marshalling all the facts in their proper relations."

The outline presented by Mr. Skinner will probably be helpful not only to young engineers with little or no experience in designing plants, but also as a check list or reminder to engineers of wider experience. The outline is given below.

DATA TO BE CONSIDERED

1. Physical Conditions.

A. *Area of Territory.*
- (a) Present.
- (b) Future.

B. *Character of Territory.*
- (a) Compact or scattered.
- (b) Residential, commercial or industrial.
- (c) Flat or hilly, gentle or steep slopes.
- (d) Low, requiring pumping, or high, allowing gravity outfall.
- (e) Geology, sand, gravel, clay, quicksand, rock.

C. *Population, Density and Total Numbers.*
- (a) Present.
- (b) Future.
- (c) Resident.
  - a. Home and Business.
  - b. Home only (commuters).
- (d) Non-resident (industrial).
- (e) Seasonal (Summer colony).
- (f) Transient (Summer resort).

2. Sewerage System.

A. *Character of Sewer System.*
- (a) Separate.
- (b) Combined.

B. *Amount of Sewage.*
- (a) Dry weather flow } Obtained by:
- (b) Maximum flow }
  - a. Amount of water supply and population.
  - b. Sewer gaugings.
  - c. Proportion of stormwater admitted in case of a combined system.
  - d. Precipitation, run-off data, % impervious, etc.

C. *Character of Sewage.*
- (a) Domestic waste.
- (b) Industrial waste.
  - a. Solids d. Source.
  - b. Color. e. Chemical constituents.
  - e. Odor f. Temperature.
- (c) Ground water.
- (d) Street wash (in case of combined system) quauntity of manure, leaves, grit, etc., received through surface sewers.
- (e) Settleable and suspended solids with their settling rates.
- (f) Effect of various precipitants, especially in the case of preponderating trade wastes.
- (g) Oxygen demand—putrescibility.

3. Body of Water Receiving Effluent of Plant.

A. *Non-Potable, no bathing.*

B. *Salt water with beaches to protect.*

C. *Tidal stream—bathing.*
D. *Fresh water lake.*
  (a) Bathing.
  (b) Water supply.
E. *Fresh Water Stream.*
  (a) Large or small.
  (b) Riparian uses.
  (c) Industrial uses.
  (d) Bathing.
  (e) Water supply.
F. *State Regulations Regarding Discharge of Sewage.*
G. *Currents—Dilution and Dispersion.*
H. *Deep or Shallow.*
I. *Constant or Variable Level.*
  (a) Fluctuation due to tides.
  (b) Fluctuation due to precipitation.
  (c) Fluctuation due to storage.
J. *Temperature*—Water and Sewage.
K. *Wind*—Prevailing Direction and Intensity.
L. *Vegetation.*
M. *Pollution other than by this Effluent.*
N. *Protection of Fish, Oysters, etc.*
O. *Visual and Aerial Nuisance.*

4. Funds Available for Sewage Treatment.

II.
CONCLUSIONS FROM THE DATA

1. Volume of Sewage to be Treated.
A. *Dry Weather Flow*—Present and Future.
B. *Maximum Flow*—Present and Future.
C. *Distribution*—Through Day and Week.

2. Character of Sewage.
A. *Variation in Density.*
B. *Solids*—Settleable and Suspended.
C. *Oxygen Demand*—Putrescibility.
D. *Color, Odor, etc.*

3. Character of Treatment Indicated.
A. *Discharge into Non-Potable Water.*
  (a) Remove floating and coarse* suspended objects.
  (b) Remove grit where necessary to prevent deposits in stream, lake or long cutlet pipe.
B. *Discharge into Small Non-Potable Stream.*
  In addition to "(a) and (b)" above treat further sufficiently to prevent nuisance.
  (e) Remove settleable solids and 40 to 90% of suspended solids by tank treatment.
  (d) Oxidize effluent.
C. *Discharge into Large Potable Stream or Lake where there is ample Dilution and Oxidation. Treat as in* (a) (b) and (c). "(c)" may be omitted if the effluent does not appreciably effect the receiving body of water.
  (e) Disinfect the effluent when sewage pollution, possible from the effluent, can be detected near bathing beaches or water works intakes.
D. *Discharge into Small Potable Stream or Lake.*
  Treat as indicated in "(a) (b) (c) (d) and (e)" above.

III.
TYPE OF PLANT APPLICABLE

The above operations may be accomplished respectively by means of the following devices:
(a) Remove floating and coarse* suspended objects by coarse racks, fine racks or mechanical screens.
(b) Remove grit by detritus chambers.
(c) Remove settleable solids and 40 to 90% of suspended solids by tank treatment with or without precipitants.
(d) Oxidize effluent by irrigation, sand filtration, contact beds, trickling filters, or aeration or activation.
(e) Disinfect the effluent by liquid chlorine or bleach.

IV.
ELEMENTS OF DISPOSAL PLANTS

1. Removal of Solids.
A. *Screening Devices.*
  (a) Coarse racks: Bars 2" to 4" apart for large objects in combined sewage.
  (b) *Fine racks*: Bars ¾" apart for coarse floating and suspended matter in fresh sewage, when followed by tank treatment.
  (c) *Fine mechanical screens*: For coarse floating and suspended matter, particularly in the case of stale or septic sewage when followed by further treatment. The removal is mainly garbage. Also where no further treatment is required, as above in II—3—A and C.
B. *Detritus Chambers*: For the removal of grit and heavy (mainly inorganic) solids which will settle from a stream flowing at a mean velocity of one foot per second. This should precede fine racks or screens; more important for combined sewage.
C. *Tanks*: For the removal of settleable solids and 40% to 90% of suspended solids.
  (a) Sectic tanks, 8 to 12 hours detention.
  (b) Biolitic tanks.
    a. Agitation chamber 6 to 8 hours detention.
    b. Settling chamber 2 to 3 hours detention.
  (c) Imhoff tank.
    a. Flow chamber—3 hours mean detention for best removal.
    b. Digestion chamber—4 to 6 months sludge.
  (d) Settling tank—3 hours mean detention with continuous removal of sludge for separate digestion, with or without a precipitant.

2. Oxidation of Effluent.
A. *Dilution* in Lakes or Streams.
B. *Broad Irrigation*: Only applicable under unusual conditions of isolation and cheap land.
C. *Sand Filters*: Only applicable where large areas of natural sand and gravel are available in suitable location.
D. *Contact Beds*: For locations so close to habitations that the spray from sprinklers would cause nuisance.
E. *Trickling Filters*: Of broken stone or brush. This is probably the best known method of artificial oxidation of tank effluent. When carefully designed and constructed they have been uniformly successful on well settled sewage which does not contain unusual elements, trade wastes, etc. They are expensive to construct but cheap to operate. They should be followed by settling basins for secondary sludge.
F. *Aeration or Activation*: The process known as "Activated Sludge" produces a well oxidized effluent by means of agitation and thorough mixing of sewage, air and previously aerated sludge. It is a plant relatively cheap to install but most expensive to operate. It requires less area than any other artificial method of oxidation but it is limited to situations where cheap power is available, where fertilizer can be produced as an offset to the expense of operation and upon a large scale. Certain adaptations still in the experimental stages offer promise of success.

3. Disposition of Solids.
A. *Screenings.*
  (a) Incineration.
  (b) Composting for fertilizer.
  (c) Treated as garbage.
    a. Buried.
    b. Burned.
    c. Reduced.
B. *Grit*: Dumped for filling.
C. *Sludge.*
  (a) With or without digestion.
    a. Dumped in deep water or discharged during flood conditions.
    b. Lagooned or dried in furrows and covered.
  (b) With digestion: Drained on drying beds and used
    a. For fertilizer.
    b. For fertilizer base.
    c. For filling.

4. Disposition of Effluent.
A. *Direct* in to receiving Body of Water.
B. *Through Long Conduit* to avoid local pollution.
C. *Chlorination* where necessary with
    a. Liquid chlorine or
    b. Bleach.
  To Protect
  (a) Water supply.
  (b) Shell fish.
  (c) Bathing beaches.

*Without entering into controversy as to the amount removable by screens, in this paper, **coarse** solids are distinguished from **fine** in that the latter are best removed by sedimentation or precipitation.

V.

OBSERVATIONS

There are certain details in the construction and operation of disposal plants which are too often overlooked, as they are generally omitted in the literature of the subuject.

Provide the plant, where necessary, with:

1. Water under pressure.
2. Industrial railway.
3. Light.
4. Heat in building for cold weather.
5. Repair shop with forge, pipe cutter, stock and dies and bench tools.
6. Laboratory and apparatus.
7. Power for the above and other uses.
8. Labor under competent supervision.

The moving of sludge, grit and screenings is often most conveniently accomplished by an industrial railroad preferably operated by storage battery locomotives, as this method obviates the danger of exposed trolley wires.

In fortuitous situations, like two of the present and two of the future plants of Rochester, N. Y., *power* is obtained from the fall of the sewage and fuel is only used for heating; otherwise it must be provided and becomes an important element in the expense of the plant.

A certain amount of labor may be effectively employed in hosing and washing down decks and walls, skimming tanks, agitating scum in gas slots by streams or by the use of tamps to prevent the formation of a continuous crust and afford free vent for the gas.

Labor is also required in operating gates, removing sludge, grit and screenings; raking over the surface of trickling filters when the first "ponding" appears, inspecting and cleaning spray nozzles daily as well as the distributing and collecting pipes.

Such operations are most certainly performed when a methodical schedule is maintained and directed by a responsible man on the job.

Flies in large numbers are disgusting around a disposal plant and can be largely avoided by reasonable precautions. As they come to obtain food, they can be discouraged by keeping all surfaces washed clean and by barring floating solids from quiescent water in tanks.

In the relatiively rapid current of a detritus chamber in advance of screens, it is only necessary to keep the walls washed clean. Grit from a properly operated detritus chamber will not attract flies, neither will well digested Imhoff sludge, whether wet, spadable or dry.

Fine screens and efficient scum boards, hosing and occasional skimming will minimize the floating solids in a settling tank, or reduce them to such size that they will not support a fly.

Screenings attract flies as they are largely composed of garbage. They should be covered with grit, earth or ashes or compacted and sprinkled with borax solution.

Small moth flies which are found in warm weather on and above a trickling filter come from the larvae resident on the stones just below the suruface. They do not travel far from the filter and are not objectionable. They may be kept out of other portions of the plant by screening doors, windows and other openings, and by providing curtain walls dipping below the surface of the sewage.

Odors. The best plan is to surround the plant by a large tract of land municipally owned and controlled, but even then certain odors which reach to considerable distances may produce nuisance unless controlled.

Well digested Imhoff sludge is not objectionable and can be noticed only in the immediate neighborhood. Odor from screenings can be controlled by covering as suggested above. Liquid sewage when undisturbed does not give much offence, but when it is broken up in rapid currents by means of baffles or tumbled over weirs, it becomes more noticeable.

Odors have been found objectionable at distances of half a mile when sewage is blown into the atmosphere as spray, by air under pressure.

This nuisance does not occur when the wind direction is unfavorable, nor yet when there is perfect quiet. A strong wind or good breeze does not seem to cause trouble to leeward for the vapor is too attenuated when mingled with a considerable volume of air. Smells seem to be carried furthest with a scarcely perceptible drift of the air.

The remedy for this condition consists in covering so that rising spray or vapor will impinge upon the under surface of the cover and be condensed.

At the Main (Irondequoit) Sewage Disposal Plant of Rochester, N. Y., where the total cost, including the site of 315 acres on the shore of Lake Ontario, was $975,000, and where 45 feet head is available most of the time, the cost of accessories such as water works, railroad, grading, light and power was $108,000.

In general such accessories, includuing equipment of shop and laboratory, may amount to 10 or 15% of the cost of the plant.

Women Becoming Active in Highway Construction

The surprising extent to which women are invading the field of highway construction is shown by a long list of feminine road builders invited to the American Good Roads Congress to be held in Chicago next January. Among these is Dr. Jennie C. Murphy, the only woman street commissioner in the world, who bosses the construction gangs and street cleaners at Yankton, S. D., and has held the job for several years. Mrs. Axel Holm, of South Range, Wis., road contractor, has just completed 4¼ miles of state highway near Superior, Wis., that forms a part of the great Mississippi Valley Scenic Highway from New Orleans to Canada. Mrs. Holm handles the finances of her company, bosses a gang of 57 workmen, cooks their food and looks after the welfare of her machinery and 20 teams of horses. Two daughters, Vivian and Verna, keep her books and assist her in her work.

Miss Eva Cressey, president and general manager of the Cressy Contracting Co., at Everett, Mass., manufactures road machines that are used in many states for spraying oil, tar and asphlat in road work.

Miss H. M. Berry, of Chapel Hill, N. C., as secretary of the North Carolina Good Roads Asso-

ciation, did much to put over the $50,000,000 bond issue for roads now being constructed in her state.

Dr. Lou Alta Melton is said to be the only woman bridge engineer in the country. She graduated in civil engineering last year at Colorado University and is now connected with one of the district offices of the United States Bureau of Public Roads. She is the only woman engineer in the employ of the Federal Government.

Nimishillen Creek Wall

A long, high concrete retaining wall built with dragline machines that excavated wet trench and afterwards served as locomotive cranes for handling heavy form panels.

The improvement of the Nimishillen creek, Canton, Ohio, included the deepening of the channel 3 feet and the construction alongside of 2,000 feet of concrete retaining wall, with an average height of 18 feet, thickness of 10 feet at base and a 12 x 3-foot footing carried down to a depth of 7 feet below the original creek bottom.

The trench for the footing was excavated by two Osgood, class 18, combination dragline and locomotive cranes, equipped with 40-foot booms and 1-yard excavating buckets.

The ground was so stiff that the sides of the trench stood at a ¼:1 slope without sheeting, thus eliminating the necessity for any sheet piling or bracing in the trench. The machines, being mounted on caterpillar traction, moved safely over the soft ground without tracks or mats and on occasion were rigged with dippers to operate like regular steam shovels. At other times the dragline bucket was replaced by a clam shell or by a simple hoisting tackle enabling the machine to act as a regular locomotive crane.

The large amount of water entering the trench was satisfactorily handled by a 6-inch Morris motor driven centrifugal pump, installed on skids at the lower end of the wall and draining the entire length of 2,000 feet. Besides these regular pumps, two gas driven 4-inch Domestic Foundation pumps, were kept on hand for emergency, but were used on only two occasions.

As the trench was completed the footing was concreted in rough forms and the wall was built on it in sectional wooden forms, made in 26-foot panels, handled by the locomotive crane. The front and rear panels of the forms were made with horizontal boards nailed to vertical studs that took bearing on six lines of walling pieces that projected beyond the ends of the panels to connect with the adjacent panels and were braced by inclined struts with their lower ends engaging steeply inclined plank footings that distributed the pressure on the earth.

The concrete was mixed in a portable machine on top of the bank, which moved along with the work and deposited directly into the forms. After the completion of the wall the Osgood machines were changed back to draglines for backfilling, except in some restricted clearances where they used clamshell buckets.

The work was executed by the Fred R. Jones Co. contractor, who considered the machine used to be very convenient for this style of work on account of its flexibility that enabled it to be operated without mats for miscellaneous work and as a dragline, a locomotive crane, a clamshell excavator or a regular steam shovel as required.

Advertising On Road Signals

Several types of road signals have been adopted for directing traffic on the highways of the country, but it is probably a new idea that the state or county should be able to have these provided and maintained without any expense to them or the tax paying public. However, this is apparently provided for on the Vermont highways by an arrangement just entered into between the American Gas Accumulator Co., of Elizabeth, N. J., the Standard Oil Co., and the Highway Commission of Vermont.

The Accumulator Co. has placed in the market the device known as the "highway lighthouse" and offered to instal these signals and operate them on public highways without cost to the highway authorities if allowed to place advertising on the sides of the standards. The state highway commission of Vermont is reported to have agreed to such an arrangement and the Standard Oil Co. to have arranged with the manufacturer to advertise its products on these standards for a period of three years, under such terms, we presume, as to make it worth while for the Accumulator Co. It is said that the cost of the "lighthouse" is about $400 each in small lots. The cost of erecting it and keeping it in gas and repair is not stated. Between 2,000 and 5,000 of the signals are to be placed on the Vermont highways, some bearing the words, "Warning, Railroad Crossing," "Warning, Curve," etc., and also the number of the route on which the signal is stationed and the distance from the nearest city.

Building 7.63 Miles of 18-Foot Concrete Highway in 67 Days

An unusual record for uniformly rapid construction of a long piece of concrete highway has been made by Rogers Bros. Co., Los Angeles, Calif., in the construction of a section of the Taft-Bakersfield Highway in Kern County, Calif., where 40,346 linear feet of highway, containing 13,065 yards of concrete were finished in 67 lapsed days after the beginning of the work early in 1921. The old concrete pavement 4½ inches thick and 15 feet wide, was covered by a new surface 5 inches thick and extended on each side for a distance of 1½ feet with a thickness of 9½ inches adjacent to the shoulder 3 feet wide on each side of the pavement.

A section of the road 3,000 feet long was 22 feet wide and on a 7 per cent grade, another 2½ miles was composed of various curves and grades, and 5 miles are on tangents. All materials were unloaded from the railroad cars by a Thew steam shovel, equipped with a clam shell bucket and travelling on

a crane track parallel to the railroad siding. The clamshell loaded a maximum of 22 motor trucks that handled an average of 300 tons of aggregate daily, hauling it an average distance of 5 miles with the long grade in favor of the load.

The trucks worked from 5 A. M. until 7 P. M. or until dark, dumping their loads on the surface of the old road adjacent to the mixer, which was served by wheelbarrow gangs.

The forms were set at an average rate of 1,200 linear feet daily by a crew of variable size working one shift. The 4½-bag batches of 1:2:4 concrete were mixed in a new 21-E Foote machine operated on a double shift basis by two crews that worked from 5 A. M. to 10 P. M. with two ½-hour lunch intervals.

The surface was tamped and finished by hand and was cured by water impounded between earth dikes on both sides of the pavement and built across it at intervals corresponding to the grade.

Concreting was commenced March 26th and completed May 12th and allowing for Sundays and a number of days and half days when one or both of the shifts were idle, the actual time of concreting was 584 hours, giving an average of nearly 23 yards per hour for the entire time, or 69 linear feet per working hour. The best day's work was April 14th when one shift laid 744 and the other shift laid 730 linear feet of pavement, making a total of 470 cubic yards.

Two hundred and forty working days one shift averaged 587.6 and the other shift 509 linear feet per day, making an average total of 158 cubic yards for each 16-hour day.

Wood Block Pavement After Fifteen Years of Service*

By J. D. MacLean†

Relative wear of the several species of wood laid on a Minneapolis street by the city and the Forest Service, effect of length of block and angle of joint.

In 1906 an experimental treated wood block pavement was laid by the city of Minneapolis in cooperation with the Forest Service.‡ This experiment was undertaken to study the following variables:

(1) The relative merits of different species of wood for paving block material.

(2) The effect of the length of blocks on the wearing qualities of the pavement.

(3) The influence of heartwood and sapwood on durability.

(4) The relative wear on blocks laid at different angles.

A detailed description of the material used, method of treatment, and construction of the pavement is given in Forest Service Circular 141, "Wood Paving in the United States," by C. L. Hill, issued March 4, 1908, and in Forest Service Circular 194, "Progress Report on Wood Paving Experiments in Minneapolis," by F. M. Bond, issued January 16, 1912.

Other published information relating to the work is as follows:

"Experiments with Wood Paving Blocks," by C. H. Teesdale, "Municipal Journal," of May 6, 1915. (Illustrations with this article show arrangement of different species of wood in the pavement and cross-section of pavement,—Editor.)

"Progress Report on Wood Block Paving Experiments in Minneapolis," by C. H. Teesdale and J. D. MacLean—Proceedings of American Wood Preservers' Association, 1919.

DESCRIPTION OF THE PAVEMENT

Sections containing Douglas fir, hemlock, longleaf pine, Norway pine, tamarack, western larch, and white birch, were laid on Nicollet avenue, between Washington avenue and Second street. This portion of the street is subjected to continuous heavy traffic and the different species were placed in this location to study the relative value of each wood for pavement material.

In addition to the sections laid with the different species, three sections of Norway pine blocks were laid on Nicollet avenue, north of the intersection of Second street. These sections were laid at angles of 90 degrees, 45 degrees, and 67½ degrees with the curb for a comparison of wear on blocks laid at different angles. The blocks in the sections containing the different species were all laid at an angle of 67½ degrees with the curb.

All curbs in the experimental pavement were 4 inches deep and 4 inches wide. The lengths of the blocks of the different species were as follows:

Longleaf pine, variable	6 inches to 10 inches
Norway pine, variable	6 inches to 10 inches
Tamarack, variable	6 inches to 10 inches
Douglas fir, variable	6 inches to 10 inches
Hemlock	6 inches
Western larch (one-half of section)	6 and 8 inches
Western larch (one-half of section)	4 inches
White birch (one-half of section)	6 and 8 inches
White birch (one-half of section)	4 inches

*Paper before American Society for Municipal Improvements.

†Engineer in Forest Products, Forest Products Laboratory, Madison, Wis.

‡Special acknowledgement for assistance in the experiment is due to the City Engineering Department of the city of Minneapolis and the following companies cooperating in the work; The Republic Creosoting Company and the Kettle River Creosoting Company of Minneapolis, The John Week Lumber Company of Stevens Point, Wisconsin, The Cloquet Lumber Company of Cloquet, Minnesota, The Larson Lumber Company, Bellingham, Washington, and the Westside Lumber and Shingle Company, Portland, Oregon.

The blocks were placed on a one-inch sand cushion over a five-inch cement foundation. One-inch expansion joints were provided at each curb and partially filled with sand. The body joints and the top of the expansion joints were filled with a pitch filler, after which a sand dressing was placed over the finished pavement.

TRAFFIC CONDITIONS

Although the street is fifty feet wide, parking of automobiles along the curb causes the traffic to be concentrated along the central part of the pavement so that about one-half the total width of the street receives most of the wear. This is particularly true of that portion of the pavement between Washington avenue and Second street, where the sections containing the different species are located. The three sections of Norway pine north of the intersection of Second street, which have blocks laid at different angles, do not appear to be under such severe wear as those in the other sections. This is probably because traffic is distributed over a greater width of the pavement, on account of fewer automobiles being parked in this area, and on account of the shorter distance between intersecting streets.

The following traffic census,* taken from 7:30 a.m. to 7:00 p.m. on June 27, 1921, gives an indication of the amount of traffic passing over the experimental sections which contain the different species.

Kind of Vehicle	Number
Steel tires	165
Bicycles and motorcycles	142
Automobiles	3,501
Trucks	717
Total	4,525

INSPECTIONS

Annual inspections have been made since the wear developed sufficiently to show progress of deterioration. On account of the pockets and depressions of different sizes and shapes that develop as the time of service increases, a very satisfactory measurement of the wear cannot be made. However, in order to make a comparative estimate of the relative wear on the different sections, the following method was adopted:

(1) An estimate of the total number of square feet in a section below the general level was made.

(2) An estimate was made of the total number of square feet in a section, ½ inch or more below the general level of the street.

(3) Measurements were made on individual blocks to determine the average wear.

The estimates of the area of depressions below the general level of the surface were made independently by each member of the inspection party, after which the estimates were averaged and recorded. When depressions are not extensive, such estimates can be made with a fair degree of accuracy, but as the depressions become more numerous, greater difficulty is experienced and wider variations are to be expected. While it is difficult to make close estimates of the area affected by depressions, particularly as these areas increase to considerable proportions, the average estimates, however, furnish a means of determining the relative condition of the different sections.

In order to correct as much as possible for variations in estimates made in different years, the data were plotted and average curves drawn as shown in the accompanying illustration.

The measurements of wear were made on blocks taken from the central part of the street where the surface was thought to be fairly representative of the wear in the section.

RESULTS

All of the species originally placed in the pavement are still in service except the Douglas fir blocks, which were removed in 1911. It was necessary to re-lay the section containing this species after five years' service, as some of the blocks were broken and deep depressions had formed over a large area of the section. The early failure of this wood was probably due to a poor quality of material used in the original construction. For a further test of this species a part of the same section was re-laid with a better quality of wood. Only a limited supply of these blocks could be obtained at the time and the remainder of the section was therefore paved with the standard yellow pine blocks furnished by the city.

RELATIVE WEAR OF SPECIES

The curves in the illustration give a general indication of the relative wear of the different species in the test. Since the Norway pine blocks in sections 12, 13 and 14 are not under the same conditions of wear as blocks of the other species in sections 1 to 10, the curves representing the percentage of depressions are shown separately above the other curves.

White birch and longleaf pine.—Both the white birch and longleaf pine are in distinctly better condition than any of the other species. However, the white birch sections have deeper depressions than the longleaf pine and their condition is not quite as good as that of the pine. This is mainly on account of decay pockets that were present in some of the birch blocks at the time they were laid and the defective material was not discovered until after it had been in service a short time. For this reason a few decayed blocks have been removed from the white birch sections. If the unsound blocks had been eliminated before the pavement was laid the birch would probably have shown about the same durability as longleaf pine.

Norway pine.—About one-half of the section originally laid with this species has been replaced during the last two years on account of wear. The section containing these blocks is a small triangle and is situated at the intersection of Washington avenue and Nicollet avenueu. In this location all of the blocks are under very severe wear on account of the heavy southbound traffic and the turning of trucks and other vehicles at Washington avenue. Sections 12, 13 and 14 are no doubt more representative of the wearing qualities of this species and the good condition of these sections would indicate that Norway pine paving blocks may be expected to give very good results.

Eastern hemlock and tamarack.—There does not

*Data furnished by Mr. Ellis R. Dutton, Asst. City Engineer.

seem to be a marked difference in the condition of the sections containing these two species. While the hemlock blocks are apparently in slightly better condition than the tamarack, the difference is not of particular importance.

Western larch.—The sections laid with western larch have deeper and more extensive depressions than sections laid with the other species. Apparently the sections paved with this wood will require renewal before those paved with the other woods.

Douglas fir.—Since the blocks of this species have only been in service for 10 years, as compared with 15 years for the other species, a good comparison of this wood cannot be made. While no deep depressions have developed up to the present time, the progress of deterioration is becoming more noticeable each year through the increased area affected by depressions and the amount of wear as determined by measurement of the blocks. From the fact that these blocks have been in service twice as long as those replaced in 1911, it is evident that the first material was not of the best quality.

The longleaf pine blocks, laid adjacent to the Douglas fir material in 1911, are practically free from noticeable depressions.

MEASUREMENTS OF BLOCKS

Measurements made in July, 1921, by Mr. Dutton, to determine the average wear, showed the approximate decrease in depth of blocks of the different species in sections 1 to 10 to be as follows:

Longleaf pine after 15 years' service.....	1/2 inch
White birch after 15 years' service.....	9/16 inch
Norway pine after 15 years' service.....	9/16 inch
Tamarack after 15 years' service.....	5/8 inch
E. hemlock after 15 years' service.....	11/16 inch
Western larch after 15 years' service.....	11/16 inch
Longleaf pine after 10 years' service.....	5/16 inch
Douglas fir after 10 years' service.....	1/2 inch

Careful observations of the surface of the pavement showed that blocks from the wide ring or rapid growth material seem to be withstanding wear as well as those from the slower growth wood. This was particularly noticeable for the larch, hemlock, birch, and pine blocks in which the number of rings per inch was quite variable.

EFFECT OF LENGTH OF BLOCKS

The length of the blocks used in this experiment varied from 4 inches to 10 inches and the results seem to indicate that the length was not an important factor affecting the wearing qualities of the pavement. Whatever difference in wear may be noted between blocks of different length is comparatively unimportant and is probably due to other causes.

INFLUENCE OF HEARTWOOD AND SAPWOOD

In the material used for this experiment the longleaf pine, Douglas fir, and western larch, were practically all heartwood. The Norway pine and tamarack were mixed heart and sap. Heartwood and sapwood were indistinguishable in the white birch and hemlock blocks.

Results of the experiment do not appear to show any particular influence of either heartwood or sapwood on wearing qualities. Decay was found in the sapwood on some of the blocks but where this was the case the blocks had apparently not been well treated.

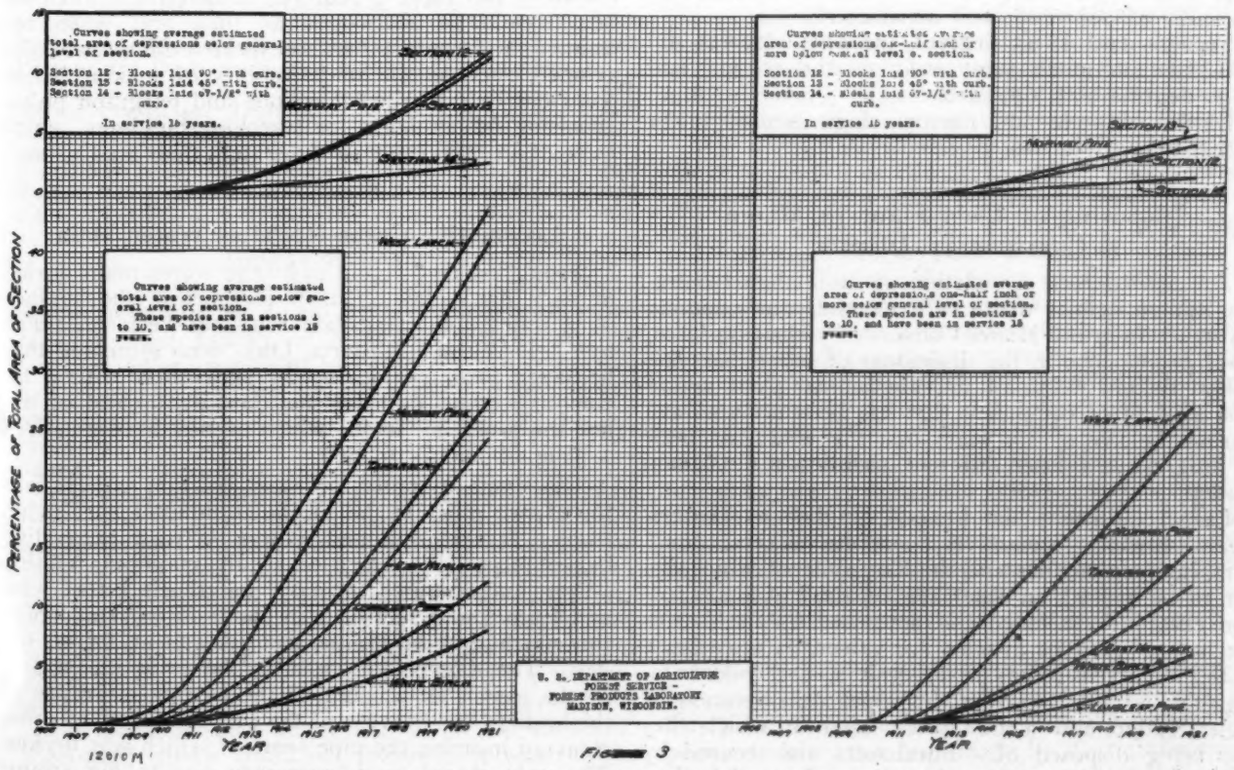


FIGURE 3

ESTIMATED TOTAL AREA OF DEPRESSIONS BELOW GENERAL LEVEL

Comparison of different woods, and of Norway pine, each at different angles with the curb.

COMPARISON OF ANGLE OF COURSES

Section 12, laid at 90 degrees with the curb, shows greater joint wear than sections 13 and 14 which are laid at 45 degrees and 67½ degrees respectively. The courses laid at 67½ degrees are in slightly better condition than those laid at 45 degrees. These blocks, however, are at the junction of Hennepin avenue and Nicollet avenue, and traffic is distributed over a larger portion of the surface. Under exactly the same conditions it is probable that little, if any, difference would be found in the relative joint wear of blocks laid at 45 degrees and 67½ degrees.

SUMMARY

Beginning with the species showing the best results (placed in sections 1 to 10) the order of efficiency so far shown in this experiment is as follows:

(a) Longleaf pine and white birch.
(b) Eastern hemlock and tamarack.
(c) Norway pine.
(d) Western larch.

If the Norway pine blocks had been under conditions similar to those in which the other species were placed, this species would probably come next to longleaf pine and white birch in order of efficiency of service.

Since the Douglas fir has not been in service for the same length of time as the other species, a good comparison cannot be made. However, the depressions and wear in blocks of this species is very marked in comparison with the longleaf pine blocks laid at the same time.

There was no evidence to show a difference in the rate of wear in blocks of different length.

A comparison of the wearing qualities of blocks with and without sapwood did not show that the presence of sapwood was detrimental.

Sections laid at 45 degrees and 67½ degrees did not show as much joint wear as the section laid at 90 degrees with the curb.

Blocks of wide and narrow rings seemed to be withstanding wear about equally well.

Disposing of Used Plant in Miami Conservancy District

The approaching completion of more than twenty-five million dollars worth of excavation and concrete construction in the Miami Conservancy District, Ohio, gives prominence to the dispositon of more than one mllion dollars worth of the mechanical plant and a vast amount of equipment that has been accumulated during the five or six years that the work has been in progress in a dozen different localities in the Miami Valley.

Large equipment like $40,000 dragline excavators, steam shovels, locomotives, concrete mixers, dump cars, hoisting engines and the like, most of which are yet to be placed on sale, are repaired if necessary and carefully examined and appraised by the master mechanic. Smaller articles are valued in accordance with the current prices of the dealers, mail order catalogs and original costs, with proper consideration of deterioration and a fair price fixed at which they are being disposed of. Purchasers are secured by advertising and by personal and circular solicitation, and many of the smaller articles, especially those derived from the labor camps, are sold locally. A recent report of two sales included 275 different items, many of them of an almost domestic character, such as used hip boots, stoves, playing cards, cash register, miscellaneous large and small articles, which paid for the total sum of $5,691.16.

In selling the labor camps, the timber and the scrap lumber and much of the tools, hardware and mess hall equipment have been advantageously disposed of to local farmers and the remainder transferred to the central warehouse for storage and sale. A number of buildings have been sold at auction, the water supply for camps has been sold in place and tracts of land have been sold to homeseekers.

Effective work has been done by systematized combing of the junk heaps, repairing some of the damaged discards found there, and using others to make spare parts for assembling new articles such, for instance, as wheelbarrows, three damaged ones often sufficing to make two good ones. Two men equipped with an automobile and an acetylene torch salvaged 1,693 cable clips from piles of discarded rope, painted them and provided new U-bolts, thereby effecting a saving of $438. A very important item of salvage was valves, many of which were discarded because of small defects that were easily remedied, making the valves efficient for continued service. The total amount of the small savings that can thus be effected is indicated by the fact that the conservancy commission purchased about 3,000 valves 2-inches in diameter or at a total value of about $10,000, 580 axes, 23,550 cable clips, 300 sledge hammers, 900 picks and other supplies in prpoortion.

Much of the damaged equipment and supplies of course became hopeless junk and were sold as such. Excellent judgment is required to determine when an item should be abandoned as junk and when reclaimed, and some rather unexpected facts were developed, such as the undesirability of making fence posts out of discarded telephone and telegraph poles, repairing rubber boots, or wrecking buildings, which were often found to cost more than their final value.

Locomotive Crane Reclaims Water Main

About 800 feet of old cast iron water main buried in very hard clay about 6 feet below the surface of a waterbound macadam road has been reclaimed by O. J. Winsor of Elyria, Ohio, who estimated that he saved $104 by making an excavation with a locomotive crane and clamshell buckets instead of doing the work by hand, which would have required a gang of about 16 men.

The crane mounted on steel traction wheels was towed two miles to the job in 45 minutes by a 3-ton truck. It was equipped with a ½-yard excavating bucket, especially rigged to secure maximum closing power, and operated to make the trench 3 feet wide and from 6 to 7 feet deep in about 14 working hours for which two days time was allowed at $20.00 per day. The digging was a little slower at the bottom of the trench on account of the narrow clearance of the buckets and because of the care necessary in order to avoid injuring the pipe some of which was broken. The only shovel work necessary was to dig around the joints.

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CONTENTS

Height of Curbs

How high should a city curb be? Is there objection to reducing the height by laying a wearing surface of sheet asphalt or other material on an old brick or other pavement, by flattening the cross-section originally designed for a macadam street, or for any other reason? This question is confronting city engineers more and more as city streets are being repaved.

The chief purposes of a curb are to keep roadway traffic and the gutter flow of storm water off the sidewalks, to give support to the sidewalk pavement or parking at a level higher than the roadway, and to add to the attractive appearance of the street. At street intersections the curb should not be higher than it is convenient to step up or down, unless there is a bridge across the gutter or unless steps are provided, which latter is generally to be avoided if possible.

Six inches has for years been about the standard. Steel-tired wheels could not mount it, it was seldom that the gutter flow exceeded this depth, and it was a convenient height for pedestians.

But with the general use of pneumatic tires, six inches no longer serves as any obstruction to vehicles. A six-inch curb shows them the limits of the roadway, which a two-inch curb would do about as well, but it would take a 12-inch curb or more to prevent their mounting it. And a 12-inch curb would be too high for pedestians, and would generally mean excessive cost for excavating the roadway and for the curb.

As to supporting the sidewalk, the shallower the curb the better it can perform this service. A curb three inches high has been used in some cities where a new surface has been put on an old pavement, the only change made being the introducing of more storm-water inlets on flat grades, to prevent flooding the sidewalks. This matter of gutter flow seems to be the only serious objection to the low curb, and with a sufficient number of inlets this largely disappears.

The low curb at first looks peculiar, but if the curb is in good grade and alignment we believe the appearance is equally as good, once one is accustomed to it. And it is more convenient for pedestrians and especially so for those wheeling baby carriages.

It would appear therefore that, provided gutter flow is adequately cared for, there is no good reason why a curb should not be as low as three inches, and often there are good reasons why it should be.

Salvaging and Reclamation on Construction Work

The importance of the systematic disposal of equipment that has been used on important construction work is forcibly illustrated by the description in this issue of the method of disposal of a vast amount of miscellaneous plant and supplies during the progress of and after the termination of a 5-year period of heavy construction in the flood-prevention work of the Miami Conservancy District, Ohio.

This work, which has cost more than twenty-five million dollars, consisted largely in the building of five great earth dams and their concrete controlling works, the relocation of railroads and highways, and the improvement of the river channel, which involved the purchase of a great amount of heavy construction plant, large quantities of miscellaneous supplies and equipment and the establishment of camps, commissaries, and stores for many employees. An unusual proportion of the mechanical apparatus, including big dragline excavators, concrete mixers, large pumps and other important items of power driven apparatus, were operated by electricity, making a large percentage of high-class plant with some delicate features.

The work is now nearing completion and much of this plant has already been released and is being put on the market by the well established purchasing division. The prices are fixed by an appraisal board and reviewed by the chief engineer, who approves or modifies the prices fixed after careful consideration by the purchasing division, salvaging division and master mechanic.

Effective newspaper advertising and publicity cooperation with reading articles has been effected, sales lists have been mailed to prospective buyers and many personal visits have been made by district representatives to possible customers. An excellent demand for some articles has been created, and where the prices

have greatly increased through war conditions since the plant was purchased, some of it has found a ready sale at prices above what was paid for it when new. Very little of the large equipment has yet been sold, but much of it will be offered immediately after Christmas. Small articles are sold locally and the remainder are stored in the central warehouse at Dayton. Camp buildings, tracts of land and an entire waterworks system have been sold in place.

An important feature has been the methodical reclamation of damaged equipment during the progress of the work. This was found to be so advantageous that a special organization was put in charge of the junk piles and trained employees have selected various classes of damaged equipment, such as gasoline pumps, jacks, dump cars, steam gages, valves and many small articles and have had them repaired or had defective parts replaced by disassembling similar items in which these parts were not damaged. In this way about $35,000 worth of jnk was reclaimed at a cost of about $3,000 and reissued at a valuation of $60,000, showing a clear profit of $22,000 besides the value as an object lesson in economy and conservation.

The same organization did very effective work in supervising the local accumulations of spare parts and reducing them to a minimum, justified by resulting promptness of obtaining supplies from one central warehouse, thus greatly reducing the number of duplicates carried and providing a clearing house effective for all parts of the widely distributed operations. A carefully perfected and well maintained policy of this sort on any construction work of importance is likely to have a large direct money value and a possibly larger value for promoting efficiency, avoiding delay and encouraging economy and carefullness.

Advertising Work Brings Low Bids

In a letter just received, a paving engineer of wide experience extending over twenty-five years or more makes the following interesting statement:

A study of the prices for paving is rather interesting at the present time as it brings out very markedly what effect actual competition is playing in the bids. Where there is no competition a city is liable to obtain abnormally high bids, especially where local contractors are the only ones bidding. For instance, the city of Columbia, S. C., asked for bids on sheet asphalt paving and a price of about $1.80 per square yard for binder and wearing surface was submitted. In Durham, N. C., the lowest bid was approximately $4.19 per square yard for the complete pavement—6 inches of concrete, and binder and wearing surface of the same thickness as that asked for in Columbia. In Columbia there was good competition, while in Durham there was none at all. The prices quoted above are only from memory and are therefore approximate, but they go to illustrate the great difference that may be noted in comparing prices of work for different cities.

Which would seem to indicate that "it pays to advertise" and that the insignificant amount spent in giving wide publicity to a letting may bring a hundred or a thousand fold return in lower cost of the work.

Federal Aid Road Work for 1922

During the month of September the Bureau of Public Roads approved projects for federal aid in a considerable number of states, and the amounts of Federal aid so apportioned are therefore available for work during the year 1922.

The projects approved, and for which bids have not yet been asked, so far as we can learn, are listed below, giving for each state the length in miles of each type of road and the estimated cost:

Alabama: 14.670 mi. gravel, $148,272.85; 4.664 concrete, sheet asphalt, or bituminous concrete, $168,608.

Arkansas: 19.820 gravel, $83,723.05.

Colorado: 4.318 concrete, $169,996.97; steel truss bridge, $27,500.

Idaho: 14.940 bituminous concrete, $25,931.18.

Indiana: 25.653 brick, bituminous, or concrete, $1,002,485; 0.912 brick, concrete, or bituminous concrete, $61,351.84.

Kansas: 19.580 earth, $161,188.50; 716 bituminous filled brick or bituminous concrete, $38,412; 2.680 concrete, $183,163.42.

Kentucky: 2.390 gravel and Kentucky rock asphalt, $41,321.50; 12.000 gravel, $226,820; 9.000 earth, $135,300.

Maryland: 4.940 concrete, $173,488.98; 6.130 gravel $127,579.21.

Massachusetts: 2.550 bituminous macadam, $133,-650.

Michigan: 6.382 concrete or bituminous concrete, $253,056.65.

Minnesota: earth, $30,095.36; 74.070 gravel, $1,-271,200.10.

Mississippi: 8.460 gravel, $126,593.50.

Montana: 11.030 gravel, $147,688.75.

Nebraska: 35.200 sand-clay, $43,993.92; 12.000 earth, $43,340.

New Hampshire: 4.530 gravel, $50,472.76.

New Mexico: 14,800 gravel, $68,657.60; 17,500 gravel or crushed rock, $98,971.40.

New York: 7,930 bituminous macadam, $188,500.

North Dakota: 15,000 earth, $47,300.

Ohio: 4.971 concrete, $190,000; concrete bridge, $106,000; .904 brick, $60,000; 2.719 Kentucky rock asphalt, $107,000.

Oregon: 3.750 concrete, $119,766.90.

South Carolina: 38.922 sand-clay, $172,946.52; bridge, $12,056.05; 32.965 top soil, $88,953.90.

Souteh Dakota: 29,320 gravel, $183,253.40; 9.470 earth, $31,262.

Texas: 12,906 gravel, $256,590.87; 22.407, gravel bituminous top, $500,231.58; 14.200 earth, $69,999.99; 17.250 gravel and macadam, $103,500.79.

Utah: 33.020 earth and gravel, $169,525.24; 13.271 concrete, $199,646.24.

Virginia: 2.100 bituminous macadam, $48,033.08.

Wisconsin: 5.850 gravel, $53,441.83.

Demand for Development Construction Relieves Unemployment

Reports from the executive offices of the Associated General Contractors are that conclusions to be drawn from their recent official inspection trip to the Pacific Coast are that "there was no need for public appropriations for useless and monumental public construction, so long as the demand for hydro-electric development, adequate terminal facilities, irrigation, and housing remained unsupplied. It was found that the war had brought this section of the country from an agricultural stage to the beginning of an industrial development which is seeking facilities and opportuni-

ties for adequate expression. To supply these will not only more than take care of the present unemployment problem, but also mean an era of development exceeding that following the Civil War."

Paving Contractors' Ingenuities

In impounding water on concrete highways for curing the concrete, the surface is apt to be scoured by the water as it leaves the hose. To prevent this a device has been used advantageously according to the *Concrete Highway Magazine;* a gunny sack has been wired to the end of a pressure hose and the water discharged through it on soft concrete where it is impounded for curing purposes. The bag is inflated by the water pressure until it forms substantially an hydraulic cushion through which the water is sprayed and is diffused over the concrete without scouring it.

Another ingenuity described in the same periodical is the use of an old 12-inch band saw blade in the construction of expansion joints for concrete pavement. The straight edge of the blade was stiffened by being bolted to a long 2 x 4-inch strip of wood projecting beyond the ends of the steel to rest on and be secured to the wooden side forms. The permanent elastite joints were placed against the vertical face of the saw blade and temporarily held by adjustable steel fingers until the apparatus was removed.

An Early Start on Road Work

With a desire to get as early a start as possible in road building next spring, county commissioners have for several weeks past been visiting the state highway department at Columbus, Ohio, to take up their next year's plans with the director of the Department. By the end of November, commissioners from thirty counties had had interviews with Director Herrick for this purpose.

Competition for Water in New Jersey

It has already been reported in these columns that Bayonne, N. J., has petitioned the New Jersey State Conservation Commission for permission to develop the Ramapo watershed in order to obtain a water supply. In addition to Bayonne, Bloomfield and Pompton Lakes, N. J., have also applied for similar permission. Bloomfield's application will come up for a hearing in January, and unless other applications are presented before that time, it is beleved that the board will reach a decision on all three applications sometime during the month.

Pompton Lakes now uses between 150,000 and 300,000 gallons of water a day, which is obtained from wells, which supply is said by the state board of health to be occasionally of doubtful safety. In addition to the doubtful quality of the water, the quantity is inadequate during dry seasons. The borough asks permission to obtain from the Ramapo river a maximum of 600,000 gallons a day, which amount the rapid growth of the borough would soon make necessary.

A great many of the communities in northern New Jersey are more or less agitated over the matter of water supply and many of them, as in the case of the Ramapo supply just cited, are contending with each other. An effort is being made to unite these municipalities so that a plan may be worked out that will be as far as possible satisfactory to all concerned. It was the purpose of the creaton of the conservation board that it should control the water supplies of the state with just this idea in view. However, the agency provided for actually carrying out the decisions of the board by the development of the available water supplies has given rise to a great deal of dissatisfaction. Newark, as was stated in these columns a few weeks ago, is objecting to having a state board, the North Jersey District Water Supply Commission, build the Wanaque dam while Newark furnishes all the money for the expenses of the board as well as for the construction of the dam but has practically nothing to say about the carrying on of the work. Should Bayonne or one of the other communities be permitted to develope the Ramapo watershed, this would probably need to be done under the control of the same board and the same objections might be found as in the case of Newark.

Because of these objections to the existing agencies, plans were made, at a meeting in Newark on December 8th of representatives from a number of New Jersey municipalities, for effecting an organization of the communities in Hudson, Essex, Passaic and Bergen counties for developing water supplies for these several communities, and incidentally for bringing about a dissolution of the present commissions and the adoption of some new plan for meeting their needs. City Commissioner Thomas L. Raymond of Newark, who called the conference, stated that there was too little accurate information on the available conditions as to water supply in northern New Jersey, and especially too much working at cross purposes and disputes among the municipalities, with litigations which were costly to the taxpayers without producing any results. He stated that writs of certiorari could tie up more public work and do more mischief generally than any other agency he knows of. As the result of this conference a committee on organization has been appointed and other committees to report on other matters preliminary to a formal perfecting of the proposed organization.

They Come High, But We Must Have 'Em

If Texaco Tips don't want its articles appropriated it has no right to publish such delicious ones as the following. Copyright or no copyright, here it is:

When earth's last project is finished,
And the concrete is ready to bust,
When the chief engineer has departed,
And the last engineer gone dust,
We shall rest, we surely will need it,
For our brain will be covered with rust,
From the worry the engineer caused us,
In making us do it or bust.

Not an engineer then will be happy,
They will all go up in the air,
When they find how the wise old contractor
Put it over them everywhere.
And got by with a ten to one mixture
When they thought a six to one there,
And got a fat estimate furnished
When the engineer swore all was done fair.

When earth's last project is finished,
And all good contractors are there,
Where estimates never are furnished,
And dictations are few and rare;
Where the golden paved streets were finished,
By contractors honest and fair,
Without a transit or level,
For I am sure no engineers are there.

But until the end of creation,
Contractors mustt always submit
To the engineer's cry and dictation,
And make him think that he is it.
And give him the morning's paper,
And talk of the ladies fair,
And give him a drink of moonshine
While shooting the concrete there.

But until earth's last project is finished,
We must call on the engineer,
For the technical end of our business,
We contractors who figure so queer.
For without his learning and figures,
His transit, and level, and grade,
We would loaf around forever,
With never an estimate paid.

So we ask you all to praise us,
For getting by you we blush with shame,
We are all skinning to get the money,
None of us ever work for fame.
We take no joy in working,
But we sit in a Morris chair,
And we run things as we wish to,
In spite of you being there.

With kindest regards to Texaco Tips and Wild Bill Howren, I am, Honestly,

W. H. CRAMER,
407 Sumpter Building, Dallas, Texas.

Protecting Jersey City's Water

Nearly twenty years ago Jersey City was a party to a suit in connection with its water supply that was a most important one to water works men in that it did much towards establishing in favor the use of hypochlorite for sterilizing public work supplies. At that time the city asked the courts to require the East Jersey Water Co. to provide an intercepting sewer to remove from the Boonton reservoir sewage that was entering it from small communities on the tributary streams. It was claimed in defense that, the amount of sewage entering being very small, the use of chlorine as a disinfectant would render the water perfectly safe, and the courts accepted the opinions of the engineers in favor of this stand. Since that time chlorination has been used on the supply as it comes from the Boonton reservoir.

However, the population on the westershed of the reservoir has been increasing and the Jersey City water department has been keeping careful watch of the several tributary streams and sometime ago was convinced that the point of pollution had been reached where chlorination alone was not a sufficient protection. Accordingly it made plans for constructing an intercepting sewer in the Rockaway river valley. the sewage so collectedt to be treated and the effluent discharged into the Rockaway river below the Boonton dam. As the Rockaway river discharges into the Passaic river, from which the East Jersey Water Co. obtains the supply for Paterson, Montclair and several other municipalities, that company endeavored to secure an injunction from the courts restraining Jersey City from building such intercepting sewer and treatment plant. Experts testified for both sides and early in December Vice-Chancelor Griffin refused to grant such injunction, leaving the East Jersey Water Co. the privilege, however, of again applying for an injunction if, after the disposal works had been built, it appears that the effluent contaminates the river from which it draws its supply.

This decision is similar to the one handed down a few months ago by the Federal Court by which the Passaic Valley Sewerage Commission was permitted to discharge clarified sewage into New York harbor, the privilege being granted New York, however, of again appealing for an injunction after the discharge of such sewage had been in operation, if it then appeared that a nuisance was being created. This would seem to indicate, what is probably the case, that the judges were not satisfied by the evidence of the witnesses that a nuisance either would or would not be created. As a matter of fact, there is little question in the minds of sanitary engineers that a plant can be designed and operated that would produce an effluent that would not create a nuisance under any specified condition, or that on the other hand the same plant could be so operated (and would be unless care and intelligence be empolyed) as to create a most decided nuisance. Such being the case it would seem reasonable for the courts, in every case of this kind, to refrain from enjoining the construction of such plants, but to hold themselves open to complaints at any time that a certain plant is creating a nuisance, and to decide thereupon, not that the plant should be discontinued altogether but that it should be operated so as to avoid the objectionable results.

Types of Federal Aid Roads

A summary has been given out by the Bureau of Public Roads showing the distribution of federal aid among the various classes of roads constructed by the different states with the aid of federal funds. Up to date these funds have totaled more than $211,000,000 and have been applied towards the construction of 2,135 miles of roads, the total cost of which has been more than $49,000,000 and has averaged $17,630 a mile.

Nearly 36% of the federal aid funds was for concrete roads, about 23 per cent for gravel roads, 12 per cent for grading and drainage, 9 per cent for bituminous macadam, 4½ per cent for bituminous concrete, 3¼ per cent, for brick and about 5 per cent for sand-clay.

The mileage and total cost of each of these several classes were as follows: 4,654.6 miles of concrete cost about $160,000,000. 10,043.5 miles of gravel road cost $104,614,067. 6,864 miles of grading and drainage cost $55,704,254. 1,323.2 miles of bituminous macadam cost $41,412,557. 772.5 miles of bituminous concrete cost $23,445,375. 444.6 miles of brick road cost something over $14,000,000. 2,695.5 miles of sand-lay road cost $22,226,363.

Recent Legal Decisions

PLANT FOR SPREADING GARBAGE AS FERTILIZER HELD NOT A GARBAGE REDUCTION PLANT

In a proceeding in equity by the board of health of Baltimore County to restrain the city of Baltimore and one under contract with it from spreading garbage in the county on the ground that it constituted a nuisance affecting the public health, the Maryland Court of Appeals holds, Mayor, etc., of Baltimore v. Coghlan, 115 Atl. 43, that wharves used as a dumping place for city garbage destined to be spread over surrounding land as fertilizer did not constitute a "garbage reduction plant" within the meaning of Acts 1908, c. 205, prohibiting the erection of any garbage reduction plant within nine miles from the Lazarette Lighthouse on the Patapsco river.

The court says that the proper rule, as approved in its prior decisions, is "to leave injured persons their remedies for damages when that affords ample relief, and not tie up municipalities by injunctions when that can reasonably be avoided. In this case we have plaintiffs who represent the health of the public; and one of their statutory duties is to prevent nuisances, when that can be done. In order to justify the continuance of an injunction against the city in this case, there must be clear and positive evidence calling for such interposition of a court of equity, and the danger to the health of the people of the county must not be merely speculative, but established with reasonable certainty; but, as the case stands now, we feel that the defendants should be required to answer." For this reason decree overruling demurrer to the bill was affirmed and the cause remanded with directions to allow the defendants to file an answer.

COST OF PAVING LATERAL STREET HELD NOT TO BE ASSESSED ENTIRELY TO CORNER LOT

The Idaho Supreme Court holds, Amsbary v. City of Twin Falls, 200 Pac. 723, that, under C. S. § 4000, 4005, the cost of paving a lateral street should not be assessed entirely to the corner lot, but should be assessed to all the lots to the centre of the block, in proportion to the benefits derived. This construction is borne out by the fact that both sections provide that the assessment must be in proportion to benefits derived, it being clear that the inside lots do derive some benefit. The same court, in construing a statute containing similar language, held that the benefits are the most important consideration. Blackwell v. Village of Coeur D'Alene, 13 Idaho, 357, 90 Pac. 353.

SOUTH DAKOTA CITIES MAY MAKE VALID CONTRACTS FIXING RATES WITH UTILITY COMPANIES

The federal district court for the Western District of South Dakota holds, Water, Light & Power Co. v. City of Hot Springs, 274 Fed. 827, that the South Dakota statutes authorizing municipal corporations to provide for lighting streets and public grounds, and to regulate the openings for gas and water pipes and the erection of electric light poles, and providing that gas and electric companies, with consent of the city council, may lay down pipes and string wires, subject to regulation by ordinance, confer no power on a city to regulate or change rates for electricity, and a city, in granting an electric company a franchise, may, by contract with the company, fix maximum rates for a stated term. Such a contract will be valid and binding during the term, regardless of the fact that the rates so fixed are or may become confiscatory. An ordinance granting a franchise including such a contract fixing rates for the term of the francise is not in violation of article 6, § 12 of the South Dakota Constitution, providing that "no law making any irrevocable grant of privileges, franchises, or immunity shall be passed."

RECOVERY BY CONTRACTOR OF COST OF SUBSTITUTED SURETY BONDS

The Maryland Court of Appeals holds, Barber Asphalt Co. v. Poe, 115 Atl. 24, that a street paving contractor which, on its surety's going into the hands of a receiver, though not declared insolvent, had, at the city's request, executed new surety bonds in another company, could not recover from the receivers the total unearned premiums on the old bonds from the date of the receivership, in the absence of evidence of any default thereon or of the suretys' inability to pay in case of such default. The contractor could, however, recover the amount paid for the new bonds, these having been substituted with the consent of the court and receivers with the understanding that by their execution the company and its receivers were released from further liability.

SUBSTITUTION OF OIL FOR PITCH IN SURFACING A PAVEMENT HELD A MERE IRREGULARITY NOT VOIDING AN ASSESSMENT

A city council, by proper proceedings under the Iowa statutes, obtained jurisdiction to improve a street by surfacing it with pitch. In lieu thereof, and for the same general purpose, they substituted oil for pitch as to the greater part of the improvement. In an action to enjoin the collection of special assessments levied to pay for the work, the Iowa Supreme Court holds, Manning v. City of Ames, 184 N. W. 347, that this was such an error or irregularity in the proceedings for which jurisdiction had attached that proper adjustment because thereof by reduction or cancellation of an assessment would have been proper for the consideration of the city council, but it did not constitute such a change of the subject matter, of which the council had jurisdiction, as to render the proceedings wholly void. It therefore followed that the plaintiffs' remedy was by the statutory method, and not by injunction, and, having failed to appear before the city council and object to the assessment under the express provisions of section 824 of the Iowa Code, the right to object was barred.

NEWS OF THE SOCIETIES

CALENDAR

Dec. 20—PHILADELPHIA SECTION, AMERICAN SOCIETY OF MECHANICAL ENGINEERS. Chamber of Commerce. Secretary, Prof. W. H. Kavanaugh Un. of Penn.

Dec. 22-23—KANSAS ENGINEERING SOCIETY. Annual meeting. Hutchinson, Kan. Secretary, J. M. Averill, Topeka.

Dec. 28—BOSTON SOCIETY OF CIVIL ENGINEERS. Special meeting. Tremont Temple, Boston. Secretary, Richard K. Hale.

Dec. 27-30—AMERICAN ECONOMIC ASSOCIATION. Pittsburgh, Pa.

Dec. 28-29 — AMERICAN ASSOCIAFOR LABOR LEGISLATION. Fifteenth Annual Meeting Pittsburg. Frederick MacKenzie, Director of Publicity, 131 E 23rd St., New York.

Dec., 27-31 — AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE, SMITHSONIAN INSTITUTE, Washington, D. C. Toronto, Canada.

Jan. 4-14 — CLEVELAND, OHIO, BUILDING EXPOSITION. Municipal auditorium, Cleveland, Ohio.

Jan. 5-6 — AMERICAN ENGINEERING COUNCIL, FEDERATED AMERICAN ENGINEERING SOCIETIES. Annual meeting, Washington, D. C.

Jan. 6—DETROIT ENGINEERING SOCIETY. Secretary, O. H. Dawson.

Jan. 9 — MEMPHIS ENGINEERS' CLUB. Memphis, Tenn. Secretary, A. S. Fry, Memphis.

Jan. 10—ENGINEERING SOCIETY OF BUFFALO. Iroquois Hotel, Buffalo. Secretary, N. L. Nussbaumer, 80 W. Genesee St., Buffalo.

Jan. 12 — ENGINEERS' CLUB OF DES MOINES. Des Moines, Ia.

Jan. 12-14—HIGHWAY ENGINEERS' ASSOCIATION. Baltimore Hotel, Kansas City, Mo. Secretary, C. W. Brown, State Hgwy. Dept., Jefferson City, Mo.

Jan. 13 — ENGINEERS' CLUB OF SEATTLE. Seattle, Wash. Secretary, Lyman T. Banks, 916 L. C. Smith Bldg., Seattle.

Jan. 14—LOUISIANA ENGINEERING SOCIETY. New Orleans. La.

Jan. 17-19 — IOWA ENGINEERING SOCIETY. 34th annual meeting. Sioux City. Secretary—Lloyd A. Canfield, Des Moines, Ia.

Jan. 17-19—ASSOCIATED GENERAL CONTRACTORS. 3rd annual meeting. Hotel Winton, Cleveland Ohio.

Jan. 17-19—ASSOCIATED BUILDING CONTRACTORS OF ILLINOIS. Chicago, Ill.

Jan. 17-20—ASSOCIATION OF CANADIAN BUILDING AND CONSTRUCTION INDUSTRIES. 4th annual conference. Royal Connaught Hotel, Hamilton.

Jan. 17-20 — AMERICAN ROAD BUILDERS' ASSOCIATION. Annual Convention and good roads show. Chicago, Ill.

Jan. 18-19—AMERICAN SOCIETY OF CIVIL ENGINEERS. Annual meeting. New York City.

Jan. 18—ASSOCIATED ENGINEERING SOCIETIES OF ST. LOUIS. Annual meeting. Secretary, Miss C. B. Adams, 3817 Olive St., St. Louis.

Jan. 18—SIOUX CITY A. A. E. Joint meeting with the Iowa Engineering Society convention. Sioux City, Ia.

Jan. 20—BRIDGE BUILDERS' AND STRUCTURAL SOCIETY. New York City.

Jan. 24-26—ILLINOIS SOCIETY OF ENGINEERING. 37th annual meeting. Decatur, Ill.

Jan. 27 — NEW YORK SECTION, AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Engineering Societies' Bldg., New York City. Secretary—G. I. Rhodes, 115 Broadway, New York City.

Jan. 27-28 — WESTERN PAVING BRICK MANUFACTURERS' ASSOCIATION. Kansas City, Mo.

Jan. 27-28—ARKANSAS CHAPTER, A. A. E. Little oRck, Ark.

Jan. 30—SOCIETY OF AMERICAN MILITARY ENGINEERS. Washington, D. C.

Feb. 13-16—AMERICAN CONCRETE INSTITUTE. Annual Convention Cleveland. Secretary Harvey Whipple, 814 New Telegraph Bldg., Detroit, Mich.

Feb. 12-17 — CONFERENCE OF HIGHWAY ENGINEERING, 8th annual conference. University of Michigan, Ann Arbor, Mich.

Feb. 15-17—AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Tenth midwinter convention. Engineering Societies' building, New York City.

Feb. 21-23 — MINNESOTA FEDERATION OF ARCHITECTS AND THE MINNESOTA SOCIETY OF CIVIL ENGINEERS. First annual convention Curtis Hotel, Minneapolis.

Feb. 22—AMERICAN BUILDING EXPOSITION. Municipal Auditorium, Cleveland, Ohio.

Apr. 27-30—BUILDING OFFICIALS' CONFERENCE. Apr. 27-28, Cleveland, O.; Apr. 29, Massillon, O.; Apr. 30, Youngstown, O.

May 15-19 — AMERICAN WATERWORKS ASSOCIATION. Annual convention. Philadelphia, Pa.

IOWA ENGINEERING SOCIETY

The 24th annual meeting of the Iowa Engineering Society will be held at Sioux City, Ia., on January 17-20th inclusive. The membership of the society has been greatly increased during the past year, and the activities of the organization, under the leadership of President J. H. Dunlap, are so interesting to the engineers of the state, that a much larger number than usual will be expected at the annual gathering.

BOSTON SOCIETY OF CIVIL ENGINEERS

A meeting of the Boston Society of Civil Engineers was held at Chipman Hall, Tremont, on December 21st, at which Arthur W. Dean, chief engineer, Division of Highways of the Public Works, Department of Massachusetts, spoke on "Highway Construction in Massachusetts." Following this address was a discussion of the subject opened by John R. Rablin of the Metropolitan Park Diviion.

DETROIT ENGINEERING SOCIETY

The Detroit Engineering Society, at its meeting on January 6th, will be addressed by Albert W. Dilling, chief engineer of the Sanitary District of Chicago, on his work with the Metropolitan District.

ASSOCIATED ENGINEERING SOCIETIES OF ST. LOUIS

The Associated Engineering Societies of St. Louis, at its annual meeting on January 18th, will be addressed by Dean Mortimer E. Cooley, president of the Federated American Engineering Societies.

AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE

L. W. Wallace, executive secretary of the Federated American Engineering Societies will address the engineering secteion of the American Association for the Advancement of Science at its annual meeting on December 27-31 in Toronto. Other speakers at this meeting will be J. B. Tyrell, vice-president of the section and a member of the American Institute of Mining and Metallurgical Engineers, and W. S. Murray, chief engineer of the Super Power Survey.

BROOKLYN ENGINEERS' CLUB

At the regular meeting held in the house, December 8th, at 8.30 P. M. Paper No. 178, entitled: "The New Floating Dry Docks at the Plants of the Sun Shipbuilding Company and the Federal Shipbuilding Company, Built in Record Time," were presented by Mr. David W. Barnes, Manager for William T. Donnelly, Consulting Engineer, N. Y. City.

The paper was illustrated by lantern slides.

THE AMERICAN ROAD BUILDING ASSOCIATION

The new directors, elected November 15th, have chosen an executive committee composed of H. L. Bowlby, Washington, D. C., president; E. L. Powers, New York, secretary, and James H. MacDonald, New Haven, Conn., treasurer, of the association; H. E. Breed, New York, and R. A. Meeker, Trenton, N. J. This committee is assisting Secretary Powers in organizing the Congress and Show.

ASSOCIATED PENNSYLVANIA HIGHWAY CONTRACTORS

In connection with the second annual meeting of the Associated Pennsylvania Highway Contractors, which was held on December 16th in the Penn-Harris Hotel, Harrisburgh, Pa., a conference of the Highway Construction Industry of Pennsylvania was also held. The program included a session in the morning on "Side of Road Construction" and one in the afternoon, the subjects of which were "Equipment Manufacturers' Side of Road Construction," "Mechanical Handling of Road Materials" and "Pennsylvania State Highway's Side of Road Construction." Following these sessions a subscription dinner was held at 7 o'clock.

LEAGUE OF THE NORTHWEST

A meeting of the League of the Northwest was held at Riverside, Cal., on December 8th and 9th, the purpose of which was to gather the opinions of the states of the Soutwest in regard to the mode of procedure for the development of the entire Colorado river and to present this information to the Secretary of the Interior. A program of over 25 addresses was presented, each state in the basin being represented by one or more speakers, on the proposed development for irrigation, power and flood protection of the Colorado river, but controversies between the adherents of public and private waterpower operation prevented any definite results.

New Appliances

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations

QUADRUPLEX ROAD BUILDERS PUMP

Bulletin No. 107, of the Barnes Manufacturing Co., describes the large Quadruplex Road Builders pumping outfit which is claimed to be the most powerful portable pumping unit ever developed for water supply on road construction. The initial one of these units installed on road job supplied all the water necessary, for the 21E paving mixer and for curing the concrete, through 21,000 feet of 2-inch pipe and against a head of 310 feet. Under these conditions the pump operated at 490 pounds, often 24 hours per day, as during the extremely hot days of last summer it was necessary to cure the concrete at night as well as during the day.

The pump has been especially designed for the continuous heavy duty service required of a pumping unit on road construction. The 300 and 500-pound guaranteed working pressures of the two most popular sizes insure the displacement capacities of 40 and 60 G.P.M. respectively, being delivered to the paving mixers regardless of the conditions of elevation and distance. The pump is of the outside packed type with four plungers set at 90 degrees with respect to each other so that two are always on the suction and two on the pressure stroke, giving a steady flow with minimum pulsation.

The four cylinder pump is driven by a four cylinder engine; the La Roi in the 40-gallon-300 pound size and the Hercules in the 60-gallon-500 pound size. Each engine is mounted in three point suspension and the truck frame is similarly mounted. This mounting, in connection with the riveted gusset plate construction of the truck frame insures permanent alignment of the pump and engine.

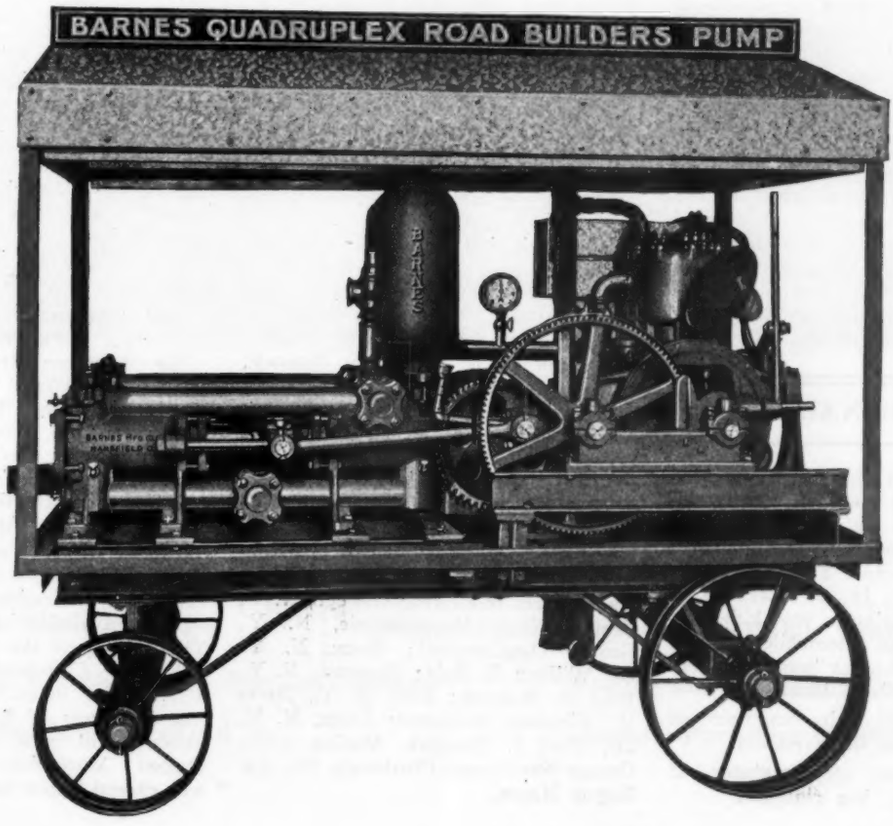
In concrete road construction, during the summer months, extremely hot weather often requires curing of the concrete at night, as well as during the day, necessitating 24-hours service of the pumping outfit. If the conditions of elevation and distance are severe, resulting in a high pressure on the pump, a dual unit consisting of two separate pumping plants mounted on one truck, is recommended. The pipe connections permit of operating one pump while the other is idle for adjustments.

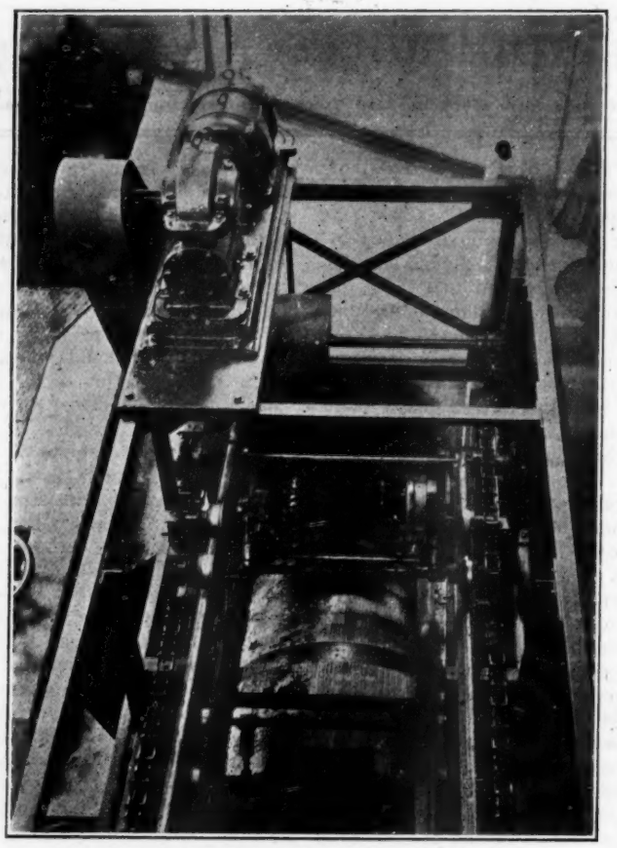
The importance of thoroughly watering the concrete in curing is now fully recognized and the contracts now specify that the concrete be wholly covered by impounding the water or by applying it from sprinkling nozzles placed at frequent intervals. Either system requires a large volume of water so that a larger pumping outfit is now required than formerly. In addition to the 40 and 60-gallon displacement units the Quadruplex is also made in a 100-gallon-300 pounds pressure size which will furnish an abundant water supply to the largest paving mixer and at the same time for abnormal sprinkling conditions.

The pump and engine, of the Quadruplex are enclosed in a galvanized sheet steel housing with removable sides thereby providing means for locking up the outfit at night.

NEW LINK-BELT SEWAGE SCREENS

The Link-Belt Company has designed a fine sewage screen, that combines great strength and rigidity with efficiency and reliability of operation. It is a cylinder covered by perforated plates or the Link-Belt Straight Wire Screen, which consists of bronze wires stretched tightly across a bronze frame. The sewage enters on the outside of the cylinder and is discharged at one end from the inside; 90 to 95 percent of the total screening area is submersible; in other words effective. Seal rings sep-





"LINK BELT" SEWAGE SCREEN OF THE PLEASANTVILLE, N. Y., PLANT

arate the clarified from the raw sewage.

The screen is cleaned by revolving brushes, that always travel in line with the openings and never across them. This feature together with the small openings—made possible by the Link-Belt Straight Wire Screen—insure the removal of all but the finest solids in suspension. No parts of the driving machinery are hidden, all parts of the screen can be inspected and cleaned without interrupting the operation.

Two of these machines are now in operation at the sewage treatment plant, Pleasantville, N. J., and are giving an excellent account of themselves.

PERSONALS

Thompson, R. A., has been appointed chief engineer in charge of construction of dams and the irrigation system of the Wichita County Water Improvement District, Wichita Falls, Tex.

Goodwin, R. T., Jr., of Athens, Ga., state highway engineer, was killed on November 8th in an automobile accident.

May, Charles A., has been appointed state engineer of New Mexico.

Cappelen, F. W., city engineer of Minneapolis, Minn., died recently.

Kendrick, Julian, city engineer of Birmingham, Ala., has resigned.

Ross, C. H., of Sioux Falls, has been appointed member of the South Dakota state cement commission.

Talbot, W. F., has resigned as engineer of the Holliston, Mass., Water Company's pumping station, after 21 years of service. He has been succeeded by Mr. Elms.

Vergison, Fred, is acting superintendent of the water board of Johnson City, N. Y., in place of Louis P. Allen, who resigned.

Further election returns show the following mayors elected: Bridgeport, Conn., Frederick Atwater; Cambridge, Mass., Edward W. Quinn, re-elected; Manchester, N. H., George E. Trudell; Burlington, N. J., Thomas S. Mooney; Paterson, N. J., Frank U. Van Noort, re-elected; Amsterdam, N. Y., Theron Akin; Binghamton, N. Y., Thomas A. Wilson, re-elected; Gloversville, N. Y., Frank A. Patten; Hornell, N. Y., Fred. A. Roberts, re-elected; Ithica, N. Y., Louis P. Smith; Johnstown, N. Y., Percy Ripton; Middletown, N. Y., Robert Lawrence; New Rochelle, N. Y., Harry Scott, re-elected; Oswego, N. Y., Prouse Neal; Poughkeepsie, N. Y., George D. Campbell; Rome, N. Y., Dr. William B. Reid; Syracuse, N. Y., John H. Walrath; Troy, N. Y., James W. Fleming, re-elected; Utica, N. Y., Dr. Fred J. Douglas; Marion, Ohio, George Neely; and Pittsburgh, Pa., Ex-Mayor Magee.

INDUSTRIAL NOTES

The firm of Hudson and Myron, with offices at 808-810 Wabash bldg., Pittsburgh, Pa., has been formed for the practice of engineering, by Leo Hudson, who for fifteen years has been in private practice, principally on waterworks sewerage, power plants, valuations and rates, and John P. Myron, who has been connected with the Pittsburgh Filter and Engineering Co. for seventeen years as secretary and engineer.

The Chippewa Pump Co., of Chippewa Falls, Wis., is represented in New York City by H. W. Goodloe, 26 Cortland st. Mr. Goodloe is the New York representative for the Crain Pump & Lumber Co. of Philadelphia, who are agents for the Chippewa pump.

The Combustion Engineering Corporation, New York City, has opened two branch offices, one in Charlotte, N. C. in charge of T. E. Nott, and the other at Seattle, Wash. in charge of Fryer-Barker Co.

The Welborn Corporation, Kansas City, Mo., has been incorporated for $4,000,000, and has acquired the patents, good will, plant and equipment of the Coleman Tractor Co.

Isaac Menline, engineer of design and construction for the Garment Center Capitol Bldg., New York City, has announced the opening of an office at 112 West 42nd Street, N. Y. C., for the practice of engineering.

The George B. Hills Co., engineers, Jacksonville, Fla., has just been established, specializing in drainage, docks and terminals and structural design.

R. F. Helland, for two years city engineer of Waxahacchie, Tex., has formed a partnership with his father, Hans Helland, city engineer of San Antonio, Tex., the firm being Helland & Helland, with office in San Antonio.

THE AMERICAN BUILDING EXPOSITION

The American Building Exposition, originally scheduled to open January 4th in the new Cleveland municipal auditorium, has been postponed until February 22nd; the later date is far more seasonable. Commercial, factory and home construction and equipment will be featured. Approximately $100,000 worth of space will be offered. The show will be put on at actual cost to the exhibitor. Indications point to the sale of every available foot of exhibit space. The staging of the show will be most elaborate. Cleveland lumber interests will combine in an exhibit expected to cost in excess of $25,000. Two brick exhibits will each cost in excess of $15,000. More than a score of others will exceed $5,000 each.